

The Journal
of the
Gold Coast Agricultural
and
Commercial Society.
(PUBLISHED QUARTERLY.)

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No. 2.

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Edited by

W. H. PATTERSON, Entomologist, Department of Agriculture.

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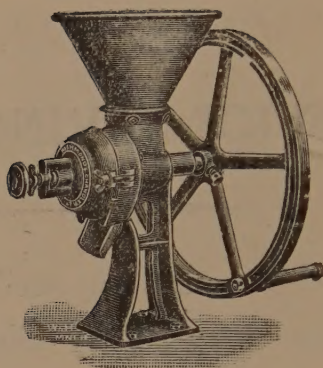
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EASTERN PROVINCE.

COCOA FARM COMPETITION.

OPEN TO FARMERS IN KWAHU AND AKIM ABUAKWA
EXCEPT THE DENSU VALLEY.

TO COMMENCE 1ST APRIL AND END 31ST
DECEMBER, 1923.

FIRST PRIZE, £15 : SECOND PRIZE, £10 : TEN THIRD
PRIZES £5, EACH.

CONDITIONS.

1. FARMERS WISHING TO ENTER THE COMPETITION MUST NOTIFY EITHER THE DISTRICT COMMISSIONER, KOFORIDUA, THE PROVINCIAL SUPERINTENDENT OF AGRICULTURE, KOFORIDUA, OR THE ASSISTANT SUPERINTENDENT OF AGRICULTURE, KIBBI, BEFORE 15TH MARCH, 1923.

2. FARMS TO BE ENTERED FOR THE COMPETITION MUST CONTAIN NOT LESS THAN 500 BEARING COCOA TREES.

JUDGING WILL BE CARRIED OUT BY OFFICERS OF THE DEPARTMENT OF AGRICULTURE WHO, IN AWARDED THE PRIZES, WILL TAKE INTO CONSIDERATION THE FOLLOWING POINTS:—

(a) GENERAL CONDITION OF THE FARM :—SPACING OF THE TREES, TREATMENT OF THE TREES, TREATMENT OF THE SOIL, TREATMENT FOR PARASITES, INSECT PESTS AND DISEASES.

(b) PREPARATION OF COCOA. FERMENTING BOXES AND METHODS OF FERMENTING, METHOD OF DRYING AND QUALITY OF THE PRODUCT.

AGRICULTURAL SHOW.

AN AGRICULTURAL SHOW OPEN TO THE WHOLE OF THE EASTERN PROVINCE WILL BE HELD IN ANYINAM, IN DECEMBER, 1923. DETAILS WILL BE ANNOUNCED LATER.

C. H. KNOWLES,

Hon. Secretary.

Eastern Province Committee,
KOFORIDUA.

CENTRAL PROVINCE.

A

COCOA FARM COMPETITION.

*will be open free of charge to farmers in the
Winnebah District.*

from 1st APRIL to 31st DECEMBER, 1923.

PRIZES.

*First £20, Second £15, Third £12, Fourth £10,
Fifth £5, Sixth £3.*

CONDITIONS.

1. *Farmers wishing to enter the competition must notify the District Commissioner, Winnebah, the Assistant District Commissioner, Agona Soadru, or the Agricultural Officer, Agona Soadru, before the 31st March, 1923.*

2. *Farms entered for competition must contain not less than 500 cocoa trees.*

Judging will be carried out by Officers of the Agricultural Department, who, in awarding the prizes, will take into consideration the following points :—

General Cultivation :—Preparation of land and general attention, spacing of trees, weeding, mulching, pruning, treatment of pests and diseases.

Preparation of Cocoa :—Provision of fermenting boxes. General care in drying and quality of the product.

AGRICULTURAL SHOW.

An Agricultural Show open to the whole of the Central Province will be held in the Winnebah District in 1923. Details will be announced later.

J. L. ATTERBURY, President.

A. B. CULHAM, Hon. Secretary.

The Problem of the Gold Coast.

The Relation between the World's Cocoa Production and the World's Consumption.

At the end of this article we give our readers a few tables that at first sight may appear formidable and dry reading, but we earnestly appeal to all who have the interest of the Gold Coast and its people at heart to study these tables and to turn in their minds our remarks thereon. The calculations at which we arrive may not be accurate but we believe that they are sufficiently so to warrant deep thought.

The production table shows that there has been *a steady annual increase in the amount of cocoa exported by the cocoa growing countries of the world*. This increase is fairly general but what affects us most is the steady advance of our nearest rival, Nigeria. This advance will probably increase in rate owing to the great competition now coming from the East in palm oil and kernel production. This, we believe, will drive Nigeria to producing more cocoa. Although no other country shows the wonderful advance made by the Gold Coast yet a comparison of figures shows that in ten years Nigeria has multiplied its production by six while the Gold Coast has multiplied by three and half.

We believe that Nigeria can and will further increase her cocoa exports. In five years we do not see any reason why she should not export 40,000 tons, and in ten years 100,000 tons. We feel certain that in the next five years the Gold Coast will increase its exports of cocoa to 200,000 tons and in ten years probably to 220,000 tons. This means that in 1926 the two countries will have added 87,000 tons, and in 1931, 167,000 tons, to their 1921 exports as shown in Table I.

We should ask ourselves the question, *will the world's consumption be capable of absorbing these extra 167,000 tons from Nigeria and the Gold Coast alone, as well as the increase probable in other countries!* It is possible that we may neglect the increases that may come in Trinidad and other places that produce higher flavoured grades, but coming nearer home, the Cameroons, for

example, which does not figure in Table I., is now producing cocoa of practically the same brand that we ourselves produce. In the hands of France and Britain it is highly likely that the exports from this mandated area will increase annually.

A study of Table III. may possibly reassure us. According to the figures given the world has usually used up the harvest except in 1919-20, the great boom year, and this in spite of the failure of Austria and Russia since 1914, and that of Germany in 14-1919 as shown in Table II. We may thus comfort ourselves by the reasonable surmise that the world can continue to consume additional production. We must, however, not be too certain for consumption has been greatly assisted by the extraordinary recovery of Germany in 1920 and 1921, in which years she took 45,000 and 102,000 tons respectively. Many people, however, who study international politics, will ask themselves if this recovery is going to last with the market in its present unsatisfactory state.

It seems to us that the answer to the whole question depends on the recovery of Germany, Austria and Russia. At the moment of writing the settlement of reparations and allied debts seems more hopeful than has been the case for some time past. Even, however, should a satisfactory solution be arrived at, the recovery of at least two of these three countries must be slow, and it is possibly doubtful whether the increased crop that we predict for 1926 will be consumed. It is equally doubtful if the world will be ready for the great production of 1931.

If this pessimistic surmise is correct, then the competition of cocoa-producing countries, and especially of those who produce "West Africans," will become very acute. With competition it is only fair to assume that home market prices must fall to between £30 to £35 a ton. *If this is so, and if the farmer is to get a fair price for his cocoa the expenses of marketing his crop must be reduced.* That is to say, if the cocoa-buyer (the merchant) is to give the farmer a good price, his (the merchant's) expenses must be reduced.

The chief expense in marketing cocoa is transport. In the Gold Coast this is as follows per ton mile:—

Head Transport 6s. 0d.

Lorry Transport — — 2s. 9d.

Road Rail Transport .. 1s. 0d.

Railway—first 50 miles 7½d.; second 6d., third 4½d., fourth 3d.

The above figures are instructive. Obviously the more we can replace roads by rails, and the more we can replace head carriage by roads, *the less will be the merchant's transport expenses, and the more he will be able to pay the farmer.*

Another big expense is lighterage and steamer rates, simply because the former is carried out in open road-steads where handling is slow and expensive; where ships are delayed by slow loading and therefore have to charge higher rates to cover their cost while at anchor; and where all cocoa, even if well fermented and prepared by the farmer, is damaged by sea-water. We have been told by cocoa buyers in England, that they have been horrified by *the mouldy bags of cocoa landed at English ports after their salt-water bath in surfboats.* Incidentally, is it fair to put all the blame on the Gold Coast farmer for his badly prepared cocoa?

What the farmer of this country must do if he wants to get a fair price for his cocoa is to insist on the Government building more railways, more roads, and finishing the new sheltered harbour at Takoradi as quickly as possible.

This is what the merchant ought to do too, especially the merchant who has not got his own private transport company and his own surf boats; he, too, should clamour for railways, roads, and Takoradi Harbour. We believe that the chiefs and farmers of this country are sensible people; that they will understand that *unless they have the railways and roads and Takoradi they will not get a good price for their cocoa.*

Take the example of Kadi in Akim Abuakwa. The cost of taking a ton of cocoa to Accra to-day is £10 15s. 0d. If a Central Province railway is built to Takoradi the cost would be £4 7s. 0d. That is, *the Kadi farmer will get £6 8s. 0d. more for a ton of cocoa than he does now, another 3s. 6d. a load.*

Take another case, Oda (Nsuaem) in Akim Kotoku, where the cost of taking a ton of cocoa to Saltpond by lorry to-day is £8 13s. 0d. With a railway to Takoradi the cost would be £3 18s. 0d. *Result £4 15s. 0d. more to the farmer.*

The above two examples illustrate the value of a railway and a sheltered harbour. We could give hundreds of other cases.

But it is not only "to-day" that the farmer should consider. What is going to be the result of "no railway, no harbour," in five years' time, when the market price of cocoa is still lower than to-day. Why? *The answer is that if we are then dependent on the high cost of lorry transport a very large number of farmers will not be able to sell their cocoa at all.*

We know that some people say that it is the Government export duty that adds to the merchants' expenses and prevents them giving a good price to the farmer. We ask these people to answer this question. *Where is the money coming from to build roads, railways and harbours if all duties are taken off?* The Government duty is £2 6s. 8d. a ton, and it is spent on railways, roads and harbours in order to reduce the cost of transport on each ton by more than £2 6s. 8d. Remove the cocoa duty and there will be no more railways, no more roads, Takoradi can shut up, and the Gold Coast cocoa trade will not only stop increasing but will begin rapidly to decrease because the present charge for transport will be too great for the market price to bear.

We have heard it said that these new railways, new roads, and Takoradi Harbour will cause increased taxation. *How can this be if all pay for themselves by cheapening transport and so increasing the trade of the country and bringing in more revenue from import duties?*

More than that, it is easy to foresee that a time will come when trade has been increased so much by the new railways and harbour that duties can be lowered, railway rates can be lowered, but this time, we recognise, has not yet arrived; *we have not got enough railways nor is the harbour finished.*

We ask all who make a living in this country out of cocoa to consider carefully the facts we have given. And who does not make a living out of cocoa? The cocoa trade brings the farmer his income, the brokers their commissions, the lawyers and doctors their practices, the shopkeepers their customers, the merchants their business, the clerks their pay. Without the cocoa trade there will be very little money in this country; without more railways and the big harbour the cocoa trade of this country will only be one-half what it is to-day in ten years' time. Then the farmers can give up work and earn nothing; lawyers and doctors can earn a beggarly pittance; merchants who have no interests in other countries to fall back on and half the African storekeepers can shut up shop; and half the Government service, Africans as well as Europeans, will be out of employment.

On the other hand, with railways and the harbour, the cocoa trade will be half as big again as it is at present; there will be increased prosperity for all; increased means of education, increased water supplies, and increased sanitation and medical service, resulting in reduced infantile mortality.

All these very desirable things depend on transport.

TABLE I.
The World's Production.

Producing Countries.	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Gold Coast ..	39,260	51,309	53,735	78,514	73,205	92,419	67,405	178,986	126,597	133,909
Brazil ..	31,415	29,554	40,318	42,620	42,879	55,750	43,899	58,782	54,464	44,080
Ecuador ..	37,078	39,809	45,365	35,495	42,667	42,158	36,513	38,598	42,807	41,066
Trinidad ..	18,878	21,825	28,775	24,518	24,893	31,812	26,593	27,541	28,446	34,843
St. Thome ..	36,012	35,811	32,564	30,617	34,336	31,882	17,332	49,945	23,471	29,276
Dominican Republic ..	20,833	19,471	20,745	20,223	21,053	23,715	18,839	22,418	23,390	28,700
Venezuela ..	10,985	17,138	17,349	18,262	15,196	20,044	19,765	20,192	20,000	22,000
Nigeria ..	3,463	3,679	4,607	8,728	9,099	15,689	10,387	25,806	17,429	20,000
Grenada ..	5,519	5,258	6,005	6,647	5,574	5,825	6,632	5,027	4,152	4,441
Fernando Po ..	2,229	2,824	3,144	3,866	3,804	3,747	4,220	32,412	4,741	5,200
Other Countries	26,385	26,966	24,885	26,068	23,281	24,371	25,060	5,680	24,137	27,018
Total ..	232,057	253,644	277,492	295,558	295,987	347,412	276,645	457,387	369,634	390,533
Increase or Decrease % ..		+0.3%	+9.4%	+6.51%	+1.5%	+17.37%	-20.37%	+65.34%	-19.19%	+5.65%

TABLE II.
The World's Consumption.

Consuming Countries.	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
U.S.A. ..	66,553	67,595	74,379	85,145	105,361	171,054	156,485	158,183	142,776	124,416
Germany ..	55,085	51,053	52,000	43,600	11,000	1,200	—	11,700	45,059	102,000
Great Britain ..	28,044	27,586	29,038	47,267	38,798	50,779	62,232	65,647	51,483	47,164
France ..	26,891	27,774	26,085	35,269	39,576	46,747	41,496	51,584	45,288	33,215
Holland ..	24,921	30,616	32,095	40,955	20,019	7,861	2,385	36,922	25,385	28,785
Switzerland ..	10,342	16,248	10,078	17,249	14,705	12,639	18,059	18,378	10,483	6,389
Spain ..	5,256	6,166	6,911	6,721	7,449	8,048	9,094	8,071	8,536	8,200
Canada ..	3,039	1,750	2,996	2,535	4,289	5,426	8,706	5,632	5,531	6,606
Italy ..	2,432	2,457	2,275	6,515	6,745	5,450	5,895	6,551	4,731	4,500
Belgium ..	6,992	6,131	5,006	3,800	2,306	1,500	606	8,094	6,233	8,000
Norway ..	1,136	1,261	1,443	1,773	2,016	1,748	1,602	3,508	3,392	3,601
Austria Hungary ..	7,324	6,158	7,700	3,000	2,206	1,000	1,500	1,906	1,456	3,200
Denmark ..	1,727	2,022	2,361	4,666	3,441	2,919	1,610	5,167	2,853	3,063
Australia ..	747	1,000	1,260	1,900	1,900	2,000	1,500	2,500	2,000	2,000
Sweden ..	1,449	1,766	1,766	4,493	3,323	439	525	4,526	3,489	1,917
Russia ..	4,481	5,235	4,000	1,500	1,000	700	700	—	—	—
Other Countries ..	5,186	3,699	4,962	4,852	5,547	5,889	7,414	7,900	8,993	7,504
Total	251,589	251,691	264,289	311,240	269,663	325,435	319,638	396,273	367,688	390,554
Increase or Decrease % ..		+ .04%	+ 5.01%	+ 17.77%	- 13.36%	+ 20.68%	- 1.78%	+ 23.98%	- 7.22%	+ 6.22%

TABLE III.
World's Production and Consumption of Cocoa.

Year.	World's Production.	World's Consumption.	Difference between Production and Consumption.		World Stocks. Year-end.	Stocks. % of Pro- duction	Stocks. % of Con- sumption.
			Harvest More.	Consumption More			
1912	232,057	251,589	—	19,532	98,949	43	39
1913	253,644	251,691	1,953	—	100,902	40	40
1914	277,492	264,289	13,203	—	114,105	41	43
1915	295,558	311,240	—	15,682	98,423	33	32
1916	295,987	269,663	26,324	—	124,747	42	46
1917	347,412	325,435	21,997	—	146,724	42	45
1918	276,634	319,638	—	43,004	103,720	37½	32
1919	457,387	396,273	61,114	—	164,834	36	42
1920	369,364	367,688	1,946	—	164,888	45	45
1921	390,533	390,554	—	21	162,867	42	42

The Gold Coast News.—10, 1, 23.

OUR COCOA FARM COMPETITIONS.

In addition to the Agricultural Shows which have been held in each of the three Provinces of the Colony and in Ashanti during the past season, successful competitions for the best kept cocoa farms have now also been concluded under the auspices of the Gold Coast Agricultural and Commercial Society, in the Eastern and Central Provinces of the Colony and in Ashanti.

According to the existing programme an agricultural Show and a Farm Competition are to be held annually in each Province.

The arrangements are carried out by the Provincial Committees acting under rules approved by the parent society. The shows are open to exhibitors from the whole Province and are to be held at different centres annually, each Province being divided into three definite areas or districts, and a centre in each district chosen alternately so that a cycle of the Province may be completed in three years. It is anticipated that the shows will thus have a greater educational value than if they were held at the same centre each year.

The Cocoa Farm Competitions are meantime to be confined to the farms within the area or district in which the show takes place. While, therefore, farmers from all over the Province may, and should, compete with produce at the show annually, they will only have the opportunity of competing in the farm competition once every three years.

The Farm Competitions extend over a period of not less than nine months, the judging being carried out by officers of the Department of Agriculture.

The following report of the Acting Provincial Superintendent of Agriculture, Ashanti (Mr. Caldwell), on the Cocoa Competition confined to the Ashanti-Akim district, serves to show the lines on which these farm competitions are conducted and the possible development of better methods of farming that may emanate from them :—

The original number of entries obtained was 198.

The farms were judged on the following scale of points :—

(a) Spacing of trees	..	..	..	..	..	10
(b) Pruning	..	..	..	..	..	10
(c) Mulching	..	..	..	..	..	10
(d) Treatment of Pests and Diseases	..	..	..	..	..	10
(e) Picking and Disposal of Pods	..	..	..	..	..	10
(f) General Cultivation	..	..	..	..	..	20
(g) Fermenting Boxes	..	..	..	..	..	10
(h) Finished Product (including process of fermentation and drying)	..	..	..	..	..	20
Total						100

The preliminary round of inspection, an onerous task, made in July, August and September by Mr. Martinson, African Assistant Superintendent of Agriculture sufficed to eliminate large numbers of competitors from further consideration. The second inspection was carried out by Mr. Alexis, African Assistant Superintendent of Agriculture, and the final one by the writer.

On the completion of the first round a consultation was held by the judges when the merits of the various competitors were thoroughly discussed and compared.

The competitors who have scored the highest numbers of points in the respective sections are as follows :—

Juaben Section.

S. I. Quansah	..	Nkwanta..	78	1st.
Kwame Asare	..	Odumase..	65	2nd.

Kumawu Section.

Yaw Kuzo	..	Kumawu..	63	1st.
Elison	..	Kumawu..	61	2nd.

Bompata Section.

Hagan	..	Obenamase	61	1st.
Ntri	..	Petriens	56	2nd.

I have much pleasure in recommending that the sectional prizes of £10 and £5 be awarded to the competitors named above, and that, in addition, the Championship prize of £20 and also the Chamber of Commerce Prize of £5 5s. be awarded to S. I. Quansah, who has scored the highest number of points over the whole competition.

It will be observed from the foregoing that the general standard of farming is far short of the ideal. The average for the best twenty farms in the competition was in the vicinity of 56 per cent, but if that of all competitors were taken it would be considerably less.

(a) **Spacing.**—When cocoa plantations were being established in Ashanti, the almost universal practice was to plant trees too close. In order to attain the desired symmetry and optimum development cocoa trees should be planted at distances of 12 to 15 feet. Anything less than this results in tall spindly trees. Under such conditions the struggle for existence asserts itself, vitality is reduced and susceptibility to diseases and pests is accentuated. The majority of the competitors lost more than six points under this heading.

(b) **Pruning.**—The points taken into consideration in judging were :—

- (1) Evidence that this operation had received attention where necessary.
- (2) Evidence of care and efficiency in carrying out the task.
- (3) Use of antiseptics on wounds.

As one would naturally expect only a few competitors scored a high mark under this heading. In many cases the operation is neglected. Where carried out carelessness is frequently evident, ragged wounds not readily adapted for easy and rapid healing being left on the trees. The use of antiseptics for treatment of larger pruning wounds is not yet general. It is pleasing to note, however, that in a few cases they are now being utilised.

(c) **Mulching.**—This consists of carrying on to the farm a supply of *easily decomposable* vegetable matter and applying to the soil as a manure. The practical value of this operation has been clearly demonstrated at Coomassie Agricultural Station. Not only do higher yields accrue, but greater vigour is imparted to the trees. The practice is not yet general but a few are now adopting it.

For more details of the value of the work pp. 154-155 of Vol. I should be consulted. *Ed.*

(d) **Treatment of Pests and Diseases.**—The farm provides evidence of the presence or absence of pests and diseases. This in itself, however, does not give sufficient indication of the activities of the farmer in this respect, as the natural factors influencing the prevalence of the various parasites vary so much in different localities. It is only fair that these should be taken into consideration when points are being allocated. Repeated inspections are therefore necessary in order to see that the farmer does not relax in his efforts to combat the menace.

(e) **Picking and Disposal of Pods.**—Under this heading were included :—

- (1) Method of harvesting.
- (2) Disposal of empty husks.
- (3) Removal of all decayed or diseased pods from trees.

Items (1) and (2) could be included under the previous heading as they are inseparably associated with the control of pod diseases. It is still the general practice of the farmer to leave the empty husks in an uncovered heap on his farm. This serves as a breeding centre for diseases to which the pod is subject. Spores find their way by various means from the heap to the pods still growing on the trees. In the same way decayed pods on the trees infect their neighbours and so disease is perpetuated. Some farmers are now adopting the practice, so long recommended by Agricultural officers, of burying the empty husks. It is pleasing to note, that on several of the competitors' farms decayed pods appeared to have been removed from the trees.

(f) **General Cultivation.**—This includes such sundry operations as :—

- (1) Weeding.
- (2) Hoeing the soil.
- (3) Provision of drains where necessary.
- (4) General condition of farm.

As often as not the superior condition of a farm may be due, not so much to the activities of the farmer, but to favourable natural conditions which pertain in his locality. When summing up the general condition of the farm it is therefore necessary to utilise neighbouring farms as a basis of comparison.

(g) **Fermenting Boxes.**—It is perhaps in the provision of proper fermenting boxes that the Ashanti cocoa farmer has displayed the greatest progress during the last year or two. Three box fermentaries are now a fairly common feature in the cocoa areas where prices are usually remunerative. None of the competitors scored the possible number of points for fermentaries, but quite a number were awarded seven and eight. It had been previously stipulated that the ideal would include a roof. In all cases the fermentaries were out in the open so points had to be deducted.

(h) **Finished Product.**—It would hardly be fair to judge a man on the quality of a small sample of specially prepared and selected cocoa which he may have kept for the judge's benefit. The methods he adopts in the preparation and drying of his product; the care he exercised, especially during the unsettled weather which usually characterises the first two months of the cocoa season merit consideration. Opportunity of comparing the methods of all competitors under similar conditions of this sort did not arise. The judges have therefore refrained from discriminating too widely under this heading.

As already stated the results of the competitions indicate that the standard of farming is still far short of the ideal.

Analysis of the results show that the standard is best in the Juaben section and worst in the Bompata section. This is just what one would expect. Previous to the advent of the Juaben railway the prices at the various centres would be in the same ratio, and it is a well-known fact that the farmer's interest in cocoa varies directly with the remuneration he receives for it.

The appreciation of the market which has followed the opening of the railway, has no doubt played an important part in stimulating interest along the route. The competition has therefore come at a very opportune time. The liberal prizes offered induced a considerable number of farmers to adopt improved methods. The potential value which the establishment of such farms entails is inestimable. They form demonstration centres for the rest of the community. With the better market which is now at their door it is unlikely that the improved methods will be discarded, but will be carried out in the future. On the contrary the tendency will be for others to copy them.

EASTERN PROVINCE COCOA FARM COMPETITION.

During the year a competition of Cocoa farms has been in progress. Some 290 entries were received from the area of the competition New Juaben, Krobo Akuapim and Densu Valley.

2. The farms were inspected at intervals throughout the months of March to November by officers of the Department of Agriculture. Some farms had to be disqualified owing to being of insufficient size, while a number of farmers withdrew their names, owing, it appeared, to a misunderstanding as to the object of the competition.

3. A special meeting of competitors was held at the Provincial Agricultural Office, Koforidua, on the morning following the Agricultural show. Some 50 competitors, including all the winners, attended, were addressed by the Provincial Superintendent of Agriculture, who referred to the objects of the competition, and explained the various points which had been taken into consideration in judging the farms. It was pointed out where marks were generally lost.

4. No farm gained full marks, and thus the farm which was awarded the first prize was capable of improvement. The excellent farms of the Krobo plantation suffered because it is not the rule for these farms to have fermenting boxes, and thus, although the largest number of prizes went to Krobo farmers, neither the first nor second prize went to this division. The following are the prize winners:—

1st prize —Moses K. Addo, Konkonuru (Aburi).

2nd „ —J. Kabena Kwao, Oyoko.

3rd prizes—Tei Adjirakor, Ablankor

Martey Doley, Kabo

C. A. Lokko, Pakro.

Pateh, Kabo.

Kwaku Boboye, Otopoi.

Tettey Agbeno, Kurakang

Nortey Adjirakor, Huhunya.

Nomo, Djomoa.

Petro Tei, Etwiso.

Amina, Takunya

Arranged in districts:—Akuapim 1st and one third prize.

New Juaben 2nd prize.

Krobo 9 third prizes.

C. H. KNOWLES,

Provincial Superintendent of Agriculture.

THE COCOA FARM COMPETITION IN THE CENTRAL PROVINCE.

By Mr. A. B. CULHAM (Acting Provincial Superintendent).

The Central Province Cocoa Farm Competition for the year 1922, which was held in the Cape Coast District is now closed, and the prize winners are as follow :—

Prize.	Name.	Town.	Division.	Points.
1st	Kwesi Emprem ..	Dunkwa ..	Abura	60
2nd	Kwami Nsaku ..	Dunkwa ..	Abura	56
2nd	Ama Biraso ..	Asempaneye	Fanti Yankumase	53
3rd	Kobina Kwakyi ..	Asempaneye	Fanti Yankumase	52
3rd	Kobina Essuanaba ..	Essuanakrom	Abura	50
3rd	S. E. Oppon ..	Atobease ..	Fanti Yankumase	49
3rd	Kofi Ewutwi ..	Moseaso ..	Mampong ..	49
3rd	Kweku Djawkran ..	Moseaso ..	Mampong ..	48
3rd	Kwesi Ardruo ..	Adjumen ..	Jukwa	47

The total number of entries was 133, reduced to 132 by one duplication, and made up from the various divisions as follows. Six were disqualified for entering farms of less than 500 trees, and one withdrew.

Division.	Entries.	Disqualified or withdrew.	Net entries.
Fanti Yankumase	56	1	17
Mampong	39	5	34
Abura	17	—	57
Jukwa	14	1	13
Hemang	4	—	4
Totals	132	7	125

It is worthy of note that the nine prizes go to six towns, three entering two prize-winning farms. The percentage of successes to qualified entries in the various divisions is, Abura 17 per cent. ; Jukwa 7 per cent. ; Mampong 6 per cent. (nearly) ; Fanti Yankumase 5 per cent. ; Hemang 0 per cent. The high proportion of successes, including the first prize, going to the Abura division, is probably explained by the proximity of the Assuantsi Agricultural Station.

The farms were first inspected by the Assistant Superintendent, Assuantsi, and later by the African Assistant Superintendent, Winnebah, who was brought through to the Cape Coast district for the purpose. The marks were averaged and the best 25 farms selected for further judging. This was carried out by the Acting Provincial Superintendent. The judging has therefore been most thoroughly carried out, and as all marks were taken into consideration in the final awards—the personal elements has been eliminated as far as possible and the utmost impartiality secured.

The competition clearly shows one outstanding point; the *standard of preparation of cocoa* (as shewn to the judges) is *very much higher than the standard of cultivation in the farms*. This is shewn in that whilst the percentage of marks obtained to possible marks in the case of farms, was rarely more than 40 per cent. for produce 70 per cent. was not uncommon.

The system of averaging of marks has obviated the possibility of a good farm being overlooked, but nevertheless, the preparation of the product, coupled with the possession of fermenting boxes, has had a marked effect on the total marks awarded in some cases.

On the first inspection, it was found that only three competitors possessed fermenting boxes, or attempts at such. The second disclosed no fewer than 26. Thus the competition has produced a decided impetus in this direction. Not all are constructed of timber in the usual way. On some farms, especially at Asemaneye, most ingenious boxes (or "cages" as the farmers themselves call them) have been constructed from bamboo, in some cases with moveable partitions, to accommodate large or small quantities, and to facilitate turning. Altogether the results in this direction are most encouraging.

It is a matter of interest to record that the winner of one of the second prize is a woman, incidentally, the only woman competitor. It is further remarkable that in this case the marks for the produce were comparatively low, yet such was the excellence of the farm that this handicap was discounted—quite the reverse of the usual state of affairs. With good marks for produce she might easily have carried off the first prize.

At the close of the competition, one is left with the impression that the farmers of the Cape Coast District can, when they wish, produce a good grade of West African cocoa. With regard to the farms themselves I am not so sanguine. Many are diseased and the effects of the attack of insects is frequently seen. Cultivation, as apart from mere weeding, is practically non-existent; only in a few isolated cases were marks awarded for mulching, and in those cases they were very low.

Judges have everywhere been the recipients of the utmost consideration and assistance.

The work of judging has been a most arduous, but an exceedingly pleasant duty.

OUR AGRICULTURAL SHOWS, KOFORIDUA.

The Eastern Province Agricultural Show was held at Koforidua on the 5th December last, in circumstances which reflected much credit on the Provincial Committee of the Agricultural and Commercial Society responsible for organising and carrying through the arrangements of its first Show in the Eastern Province.

The Show ground, situated in the vicinity of the District Commissioner's Court, was suitably adapted for the purpose, with, perhaps, the exception that the Court House itself, where the industrial section was housed, was too small to accommodate the crowds of visitors who were present throughout the greater part of the day.

In the unavoidable absence of His Excellency the Governor and the Honourable the Commissioner for the Eastern Province, the Show was opened by Mr. G. R. Manners, District Commissioner, Akuse.

On behalf of the Governor, Mr. Manners expressed regret at His Excellency's inability to be present to open the Show.

Having taken such an active interest in establishing the Agricultural and Commercial Society, the Governor would like to have attended.

Mr. Manners also expressed regret on behalf of the Honourable Commissioner, Eastern Province, at his unavoidable absence in Accra. Major Jackson, as Chairman of the Committee has seen to the organising of the Show from the beginning, and only business of the most urgent importance precluded his being present.

Mr. Manners referred to the importance of such shows, especially their educational value, pointing out that these shows would be annual affairs, and hoped that the farmers would recognise this and increase their efforts year by year.

Reference was made to the generosity of the donors and subscribers to the show fund. Messrs. African & Eastern Trade Corporation, Limited, presented a handsome Challenge Cup for cocoa which was placed on view during the ceremony.

Messrs. Lever Brothers presented a cup for palm products. This cup unfortunately did not arrive in time for the Show.

The subscribers to the fund were Messrs. Cadbury's and Fry's Buying Agency The Anglo-Guinea Produce Company, Limited, Vasmarnet Cocoa Limited, African Products Development Company, Bunso, The Compagnie Francaise de l'Afrique Occidentale, The Commonwealth Trust, Limited, Mr. B. Bame and Mr. P. S. Addo.

Mr. Manners then declared the Show open.

The Director of Agriculture (Mr. W. S. D. Tudhope) then addressed the visitors, enlarging upon the educational value of shows of the kind and emphasising the desirability of farmers studying carefully the exhibits, particularly those for which prizes had been awarded.

He referred in suitable terms to the work of the Committee, and the ladies and gentlemen who had helped in the organisation of and preparation for the Show.

Among the visitors at the opening ceremony, in addition to the residents of Koforidua, were the District Commissioner of Akwapim and Mrs. Saxton, the Acting District Commissioner of Eastern Akim, the Assistant District Commissioner of Kade, the Deputy Director of Agriculture, all the members of the Research Branch and Mrs. Bunting and Mrs. Patterson, Aburi.

The Omanhene of New Juaben and the Konor of Sra attended at the opening ceremony in state with their sub-chiefs.

The number of visitors present at the opening is estimated at 8,000.

The Police Band, by kind permission of the Inspector-General of Police, attended and added very considerably to the attraction of the Show.

The Exhibits.

The total number registered was 767, and in addition there were many late entries.

Cocoa.

The Silver Challenge Cup, kindly presented by the African & Eastern Trade Corporation, Limited, together with a prize of £5 was offered for the best six loads of cocoa. Ten exhibitors competed for the cup from Akwapim, Akim Abuakwa, Krobo and New Juaben. The samples were of excellent quality. The winner was Mr. Thomas Yaw Kani of Kibbi. The cup goes for safe keeping for one year to the Honourable Nana Ofori Atta, C.B.E., Omanhene of Akim-Abuakwa.

The class for one of cocoa, for which four prizes were offered, was well filled 119 entries being registered. The judges spent several hours examining the samples, the quality of which in general, was exceedingly high. The first prize went to Mr. D. M. Vanderpuye of Anyinam for a sample of exceptional merit, Mr. Peter Tei of Etwiso came second with a very good lot.

These exhibits show that cocoa of this particular variety of the very highest quality can be produced with ease, and visiting farmers to the Show could : : what constitutes the best quality of cocoa.

The economic products other than cocoa were not well filled, but some fair specimens were seen, particularly of pineapple, fibre, and tobacco of a quality perfectly suitable for local trade.

Live-Stock.

In the live-stock class one item of interest was a milch goat, the property of Capt. R. Ramsay, District Commissioner, milked at the Show, which attracted much attention. Some 13 horses were shown, coming from the Koforidua Zongo. In the poultry section particular mention may be made of the fowls shown by Mrs. Bettington who took all prizes for European birds. The winning turkey was a very good specimen from Akropong.

Fruit Section.

The fruit section suffered on account of the time of the year; sufficient fruit for a proper selection of show stuff being difficult to find. The oranges, however, were particularly good. The African Products Development Company had a special stall in which some fine fruit was shown, including some splendid mandarin oranges. This plantation makes a speciality of cases of mixed fruit. Funtumia, timber and vegetables were also exhibited.

The yams were particularly fine, though not numerous, and palm oil products were, on the whole, disappointing. The cup kindly presented by Messrs. Lever Brothers was not awarded at the Show as none of the exhibitors submitted the exhibit required.

Industrial.

This class of exhibits was exceedingly attractive in practically all classes; earthenware, basketwork, furniture, jewellery, cloth and needle work being well represented. A chair from Kibbi, made of cane, was an excellent piece of work and was awarded the prize for both furniture and basketwork.

The jewellery exhibit fully sustained the reputation of the local gold and silversmiths.

Special Exhibits.

These included, in addition to that of Bunso plantation already mentioned, a complete range of tools and implements, covering all the requirements of the farmer and horticulturist, shown by the African & Eastern Trade Corporation, Limited.

The Four Oaks Spraying Machine Company, Birmingham, sent five lime-washing and spraying machines, all excellent examples of the splendid workmanship of this well-known firm.

The Department of Agriculture had of fine exhibit. specimens of practically all economic products which are or can be grown here. The court in which the exhibit was shown was generally so crowded that a detailed examination of all the items was made with difficulty. The chief item of interest was a series of posters, giving sound advice to the farmer as to the requirements of his trees, the effect of pests and diseases, and the results of neglect. Each poster had a coloured picture illustrating the advice given in type. The posters were specially prepared for the Agricultural Shows at Aburi by the Assistant Director of Agriculture for Research (Mr. R. H. Bunting) assisted by Mrs. Patterson.

The prizes were distributed by Mrs. Saxton, Mrs. Inglis, Mrs. Bunting, Mrs. Goodbrand, and Mrs. Patterson.

CAPE COAST SHOW.

The Central Province Branch of the Gold Coast Agricultural and Commercial Society held its first Show on the 23rd November in Victoria Park, Cape Coast. His Excellency the Governor was present and performed the opening ceremony. He was thanked in a short speech on behalf of the committee by Mr. Van Hein. A representative gathering of Chiefs and local personages were assembled to meet His Excellency, who later made a thorough tour of the Show accompanied by the committee. The band of the Gold Coast Police was in attendance, and the ground was crowded with interested visitors. The refreshment arrangements, which were excellent, were in the hands of the Cape Coast Ladies Club.

The various classes were, with few exceptions, well filled, notably that for prepared cocoa. The exhibits in this section were of a very high standard, which goes to show that the farmer can produce a good, clean, well-fermented product when sufficient inducement offers, and it is difficult to understand why the Central Province should have obtained a reputation for inferior cocoa when capable of producing such excellent produce. All prize-winning exhibits in this section were produced by native farmers.

Live-Stock was well represented, the most notable exhibits being the cattle. These were of the small coast type which is very hardy and it is hoped that the exhibition of these will induce others to keep them. Some good Hausa sheep were exhibited. The poultry classes produced a very gratifying array of exhibits, including a considerable number of imported fowls. Some surprisingly large and good eggs appeared.

Of the section for General Export Products two classes, those for copra and coffee, produced no exhibits, though there were some excellent coconuts. This is scarcely surprising as neither copra nor coffee is exported from the Central Province. Perhaps that shewn in the exhibit of the Department of Agriculture will assist in arousing interest in copra. The cocoa in pod was a mixed lot and the winner of the first prize had the field to himself. It was very evident in this class that many exhibitors did not pay sufficient attention to the number of fruits required and lost marks thereby. Fibres were well represented, and there was some good palm oil and cola.

An overwhelming majority of the prizes for vegetables and fruits went to persons resident in or near Cape Coast. A prominent class was that for white yams, some magnificent ones being shown. The rice classes were rather disappointing in the number of entries but the quality of those appearing was good. The cultivation of this crop is almost entirely by Kroos and Mendis, the natives of the country not being interested in its cultivation, hence the low number of entries. The groundnuts were very fair.

The exhibits in the Arts and Manufactures section were most interesting and attracted a great deal of attention. Some were of excellent workmanship. A class worthy of special remark was that for pottery, some of the entries being most meritorious. A very good specimen of book-binding was shown by the Catholic Mission.

The timber exhibits were not numerous and the prizes went to that produced under European supervision.

The educational exhibit staged by the Department of Agriculture was much admired and a source of great interest to visitors. The excellent posters produced by the Research Branch were largely responsible for this and demonstrated their undoubted value. An interesting exhibit of local produce, not for competition, was put up by Dr. O'Donoghue.

The committee is greatly indebted to all who assisted in the judging. That they did their work conscientiously and well is indicated in that there were no complaints. The prizes were distributed by Mrs. Bartlett. Mr. Van Hein thanked her on behalf of the committee in a short and appropriate speech, which saw replied to by Mr. Bartlett.

WESTERN PROVINCE SHOW.

Report on Agricultural Show held at Dominase on 13th December, 1922.

Dominase is situated on the Dunkwa-Wioso road, some twenty miles from Dunkwa railway station, and can be reached by car. It is in the centre of an extensive agricultural area in which considerable quantities of cocoa and food crops are grown. There being no suitable site within the town it was necessary to clear a space at the northern end just beyond the town boundary.

The work of clearing bush for the site and erecting suitable shelters for the Exhibits was undertaken by the Chief of Dominase under the supervision of the Assistant District Commissioner. Further assistance in the arrangements was given by the Superintendent of Agriculture. The latter was also responsible for the organisation, booking of exhibits, and staging of same.

The show was opened at 11 a.m. by the Honourable H. B. Popham, M.B.E., Commissioner of the Western Province supported by the District Commissioner. The Assistant Director of Agriculture (Research Branch), and five members of the Provincial Staff of the Department were also present. There were in addition the Acting District Commissioner, Tarquah and representatives of the various merchant houses in the district. There was a good attendance of Chiefs and their representatives, together with a large following of exhibitors and sightseers.

The Commissioner in his opening speech mentioned that this Show was the first of its kind held in the District, but that it was the forerunner of what is to be an annual event in the future. The benefits and advantages of friendly competition and organised effort to improve the quality of produce, especially Cocoa, was emphasised. Also, the necessity of co-operation in making roads and generally improving means of transport.

At day-break on the morning of the Show people began to crowd in with their exhibits and the booking clerks were kept busy right up till 10.30. To find the Show thus well-supported was a welcome relief to the organisers, who were in some doubt as to whether the people had sufficient confidence to bring produce in for competition. Since there were approximately five hundred exhibits booked in, it may be assumed that the people were enthusiastic and determined to give the Show a fair trial.

A comprehensive Schedule had been prepared, consisting of seven classes :—
(1) Cocoa. (2) Various Economic Products for Export. (3) Foodstuffs. (4) Live-Stock. (5) Articles of Local Manufacture; Arts, Crafts, etc., etc. (6) Timber. (7) School Exhibits, i.e. A collection of articles of any kind made or prepared by School children.

Cocoa was well represented, there being 135 exhibits. The general quality was of a high standard and caused appreciable surprise to the organisers. Judging this section was a long and arduous task entailing much care and attention.

Economic Products for Export.—This section was disappointing and was not well supported.

Food Stuffs were fairly represented with 129 exhibits consisting of good examples of A'mankani (coco yam) Plantains, White Yams, Bananas Vegetables etc.

Live-Stock—This section was not very well represented there being but twenty-seven entries. Exhibits were of low grade and left much to be desired

Local Arts and Crafts.—This section consisted of seven classes covering a wide field. It proved the most attractive and had no less than 139 exhibits. Earthenware was well represented, the exhibits being of high merit. Wood Carving was next best in numbers and merit. Plaited work including Mats, etc., was well supported and contained some good specimens. Furniture, and Iron Work were poor, and there were no exhibits of Gold Work.

Timber was most disappointing there being but three poor exhibits.

School Exhibits.—This section was open for collection of any kind of exhibits made by school children and had to be supported by a certificate from the Master to that effect. Only five Schools competed, but the collections were fairly representative. Wioso Government School, took first prize with a collection of 113 articles, most of which were well made ; and reflected credit on the school staff.

Exhibit by Department of Agriculture for Research. The stand was attractively arranged and covered the whole range of agricultural products which the country is presently producing. The educational value of such an exhibit is almost unlimited and is extremely interesting. Apart from the numerous products displayed there were a series of educational posters illustrating a number of the diseases and pests which attack cocoa and other crops. Throughout the day there was a good attendance at this stand, which affords proof of the interest it aroused. The respective Chiefs and their followers were conducted round the stand and given a detailed explanation of the various exhibits and posters.

This, the first Show in the Province for many years, may be regarded as a successful effort. It proved attractive to the people and was supported by a very good attendance, the Show ground being crowded throughout the day. No less than seven Brass Bands were in attendance and these required no invitation to perform. Their efforts, while not always harmonious, were at least enlivening and added to the mirth of a good natured audience. Under the circumstances it may be assumed that the support of future shows is assured and there is every justification for stating that the educational value of such events is far reaching and most beneficial.

In conclusion thanks are due to all those who assisted the Society with personal support, or monetary gifts towards the prize fund. More especially to the Honourable Commissioner for opening the Show ; to the President and Officers of the Show Committee and, to those who so kindly journeyed out to Dominase to act as Judges.

SHOW IN ASHANTI.

The Show was held on the 16th of December, 1922 at Juaso, Ashanti-Akim under the auspices of the Gold Coast Agricultural and Commercial Society.

The opening was carried by the Chief Commissioner of Ashanti at 11 a.m. who made a short speech.

The Show Committee consisted of :—

1. A. E. Ellis, Esq., Coomassie Cocoa Co.
2. Wm. Caldwell, Esq., Ag. Prov. Supt. of Agriculture.
3. The District Commissioner, Juaso.
4. Mr. J. K. Kyerematen, Merchant—Coomassie.

The Judges were :—Mrs. A. C. Duncan Johnstone, Capt. A. C. Duncan Johnstone, Capt. Brent, Dr. Spiteri, Messrs. Ellis, Cotrim, Honold, Robinson, Caldwell, Smellie, Ofori, Kyerematen, Martinson, Alexis, Clerk.

Attendance.—It is estimated that 24 Europeans and 2,500 Natives attended. The latter included Chiefs from Bompata, Konongo, Wenchi, Adomfi, Asafe Nkowe.

A special Train was run from Coomassie to Juaso. Reduced fares were provided at single fare rates for the return journey.

Refreshments.—Refreshments were provided by Mr. Rowse of Coomassie.

Prizes.—Over £65 of prizes were distributed including the Coomassie Chamber of Commerce prize of five Guineas and Cadbury's Prize of £5 for Cocoa.

Prizes were presented by the Chief Commissioner of Ashanti at 3 p.m.

Exhibits.—The Exhibits numbered 389. The number is analysed as follows :—

Juasoo	187	Ademfi ..	7	Dampeng ..	3
Odumase	33	Wenchi ..	6	Bogu ..	2
Nkwanta	25	Konongo ..	6	Wieweso ..	2
Bompata	24	Banso ..	6	Sefwi ..	2
Obenemase	18	Obogu ..	6	Petriensa ..	2
Krofa	14	Moso ..	5	Bomang ..	1
Asiboa	9	Kumawu ..	5	Duapompo ..	1
Kyikiwire	9	Juaben ..	4	Ekutuase ..	1
Nyebe	7	Fwerise ..	3	Nabuem ..	1

Show Ground and Stalls.—The Show Ground was situated in front of the District Commissioner's Court. The Live-Stock was exhibited under shelters 14 feet wide and approx. 40 feet long arranged in three sides of a rectangle. The other produce was exhibited in similar arranged shelters with a frontage of 77 feet. Double tiers of wooden shelves each 10 feet long and 3 feet 6 inches wide were used. The Agricultural Department's stall was 40 feet long and 14 feet wide. Palm leaves and bamboo were used for construction purpose. Other shelters included a native bar and a shed approx. 14' x 12' for receiving exhibits. The District Commissioner's Court was used as a European bar. Decorations with flags were carried out by Mr. Bunting and Capt. A. C. Duncan Johnstone District Commissioner.

NOTES OF EXHIBITS AT JUASO SHOW.

Goats small but clean and some care taken in preparing them, probably 20.
Poultry.—Native crosses predominated. Only a few good pure breeds shown.

Cocoa in pods.—Good clean pods, some unripe. Two varieties shewn. Cundeamer and Amelonado. *Cocoa for export*.—Loads generally less than the required sizes. Only a few could be considered for prizes. Probably 40 loads.

Coffee in Parchment.—Poor, quantity deficient.

Coconuts.—Only one good sample. *Coconut Fibre*.—Only a few samples mostly prepared by Schools.

Gum Copal.—Only one sample clean ; others cloudy, quantity deficient.

Cola in pods.—Samples average. No nuts were shewn.

Maize.—Grains mixed in colour—size good—some good white cobs.

Palm Oil.—One very good sample. Others badly prepared.

Palm Kernels. Poor.

Oil Seeds.—Three samples, small and nothing new.

Butter.—Shea-butter good. One sample of cow's milk butter very bad and rancid.

Piassava Fibre.—Poor.

Rice.—One or two good samples ; some cleaned, some uncleaned.

Ginger.—Fairly large exhibit of good tubers.

FRUITS AND VEGETABLES.

Bananas. Some fine samples. One bunch of Copper bananas.

Plantains.—Large exhibit of fine bunches.

Oranges.—Some good samples of green skinned sweet oranges. Thickness of skin and sweetness varied.

Pine Apples.—Rather coarse.

Peppers.—A good show. One bush shewn with live peppers.

Tomatoes.—Mostly small and badly shaped. A large exhibit.

Cassava.—A large exhibit of very large roots, some very badly shaped.

Groundnuts in pods.—Samples good, varieties mixed and difficult to judge.

Cocoyams.—Very large.

Yams.—Some of very big shape yet leaving much to be desired. Many attacked by a fungus.

Sweet Potatoes.—Much larger than any others I have seen, some reddish in colour.

Sugar Cane.—Three samples of good clean sticks.

Other Vegetables.—Mostly in mixed lots.

Section 4.—A miscellaneous assortment of work including Ashanti Stools, Knives, gold weights, Native dolls, Hair combs, and needlework. No jewellery of value. Leather work included some hides badly cut and badly preserved.

T J. S. SMELLIE,

Honorary Secretary.

HO AGRICULTURAL SHOW.

A very successful Agricultural Show was held at Ho in the British Mandated Area of Togoland on the 6th instant. In contrast to the Shows recently organised by the Gold Coast Agricultural and Commercial Society in the Colony and Ashanti the Ho Show owed its being to private effort, and Captain Mansfield, Dr. Fraser, Mr. Hutchinson and their helpers are to be congratulated on the excellent results achieved.

Their effort was rendered the more praiseworthy by the fact that the people of the district have not always enjoyed the benefits of a British regime, and are for the most part illiterate.

Practically all of the money required for prizes and other expenses was collected from private individuals, including a number of Africans. When it is remembered how numerous such expenses are and that £147 money prizes, ranging in value from 3s. to £2, were offered, it will be understood that considerable interest in the Show was aroused. This interest was not only monetary. A great deal of trouble was taken by the originators of the Show to prepare a large piece of land, situated between the Palime and Lome roads, by enclosing it with continuous, palm-thatched stands, erecting an imposing grandstand in its centre and decorating the whole with flags and gaily-coloured cloths. Divisions of the stands were allocated to each class of the exhibits, those for the live-stock section being fenced off from the remainder, and the convenient back of a native house was effectively converted into a stand for the display of exhibits shown by the Department of Agriculture. On the day previous to the Show, and up till the time of opening, those in charge of the reception of exhibits were kept hard at work by eager exhibitors of all ages. Seventy exhibits of live-stock, 311 of Export produce, 305 of foodstuffs, and 389 articles of native manufacture were received for competition, making a total which clearly indicated the enthusiasm of the local population.

A large and orderly gathering of Chiefs and people had assembled at 9 a.m. on the 6th, when the Commissioner of the Eastern Province (the Honourable Major Jackson, D.S.O.) opened the Show. The Commissioner outlined the purposes and benefits of such a Show in a brief speech, which was happily devoid of any trace of political argument, and was followed by the Assistant Director of Agriculture who spoke on the importance of agriculture.

The awarding of prizes was undertaken by competent judges who remarked on the excellence of many of the exhibits.

In the section devoted to Export Produce, there were some good samples of cocoa, the majority of the exhibits of maize were particularly good, as were many of the samples of cotton shewn. It is, however, significant of the native producers' attitude toward insect pests of cocoa, that *only two*, of the fairly large number of *samples of cocoa pods* which were shown, *were found to be free of insect attack*.

The Foodstuffs Section was remarkable for the variety of beans, the number of yams, and the excellent quality of many of the coconuts which were shewn.

In the Native Manufactures' Section, the imitative ability of local artists was well illustrated, especially in the classes for clay modelling and wood carving. Locally woven cloth, furniture, ivory work and basket-work were also very good.

The Live-stock Section contained no striking example of the effect of careful rearing, generally speaking the exhibits were not more than "fair average quality."

During the day organised parties were shewn over the exhibits of the Department of Agriculture, and ten minutes lectures, illustrated by posters prepared by the Research Branch, were given by an African Official, on the dangers arising from neglect to control pests and diseases.

In the late afternoon the people surrounded the grand-stand for the prize-giving, which was preceded by a few words of educative criticism and useful advice.

Mrs Mansfield then presented the prizes which included a silver medal for the winner of the Cocoa Challenge Cup, given by Messrs. John Holt & Co. Ltd., for the best load of cocoa; the cup was won, and will be held until the next agricultural show, by the Head-Chief Satchi of the Ziavie division. A silver medal given by Captain Mansfield for the best exhibit of cotton, and a similar silver medal given by Dr. Fraser for the best exhibit of poultry were also presented.

COCOA FARMERS' CALENDAR.

Farm Competitions will be occupying the attention of farmers in many places and the present is the time to enter the farms competing for the prizes to be awarded at the end of this year. In the last Journal, the chief points to be considered were outlined. These should be the farmers' guiding lines for the coming year. At the same time, farmers will gain much assistance by carefully reading the remarks made by the judges of last year's competing farms (*see p. 8*) If farmers avoid the errors mentioned by the judges, they will have made much progress.

Farmers failing to win prizes last year would do well to push ahead with the improvement of their farms. It must be remembered the **competitions will be held in the same districts every three years.** In that time, even poor farms may be greatly improved by attention to the advice of the Agricultural Officers. Such work will bring the owners of the farms good returns in the form of bigger crops, in addition to the possibility of a good prize.

Pruning must not be neglected.—No longer should this be the careless lopping off of branches when the crop is being gathered. The proper time for the work is at the end of the dry season and the early portion of rainy season. It is seldom necessary to cut off large branches. As far as possible, cutting large branches should be avoided here, as in this country Cocoa wounds do not readily heal over with the formation of new bark. The rule of pruning should be :—

- (1) removal of thin branches where the head is dense,
- (2) cutting away of suckers.

Points to be avoided are ;—

- (a) making many wounds on a tree at one time,
- (b) opening the centre of the tree too much to the sun,
- (c) removing branches when the tree is in flower, or has many young pods,
- (d) neglect to cover large wounds with tar.

If owners of farms lived on the farms, the trees would be examined more frequently than is the case at present. This would mean more interest in each individual tree and each tree would be trained by the early removal of unwanted shoots.

Thumb-nail pruning.—If attended in time, useless branches might readily be taken from the tree by pinching with the thumb-nail and fore-finger. This can only be done when the shoot is soft and green. It saves the energy of the tree and the small wound is quickly healed over. These are two great advantages where the soil is not too rich and no mulching or manuring is done.

Therefore it is advisable to ;—

- (a) visit the farm frequently,
- (b) remove all unwanted soft shoots as quickly as possible,
- (c) not to allow useless production of stem suckers.

Disposal of prunings.—This should be done in such a way as to take from the farm as little as possible of material which will benefit the roots of the cocoa trees. If the pruning is done early in the season, there will be only few leaves on

the branches cut off, but during the growing season such branches would be covered with leaves. The leaves are wanted to cover the surface of the soil under the trees, where they can decay and form food for the roots, as well as assist in holding moisture for the benefit of the trees. Branches, if left to rot on the ground,

- (a) will be in the way,
- (b) may encourage the growth of injurious diseases,
- (c) will invite the presence of white ants.

Prunings should be left on the surface for a few days till the leaves fall off the branches. The woody material should then be collected into bundles and burnt outside the farm.

Burning should not be done in the farm owing to the danger of the dry leaves under the trees catching fire. Such fires are most injurious to cocoa trees, as the bark of the cocoa tree is very sensitive to such high temperature. Trees so injured may be killed to ground level, or the bark killed on the side exposed to fire. Trees so injured must be cut down to soil level and new ones trained from the basal suckers.

Value of the ashes of the prunings.—The ashes contain a most valuable manure or plant food, much needed by the roots of the cocoa trees. They should not be wasted, or simply thrown on the refuse heap, unless the refuse heap is used to supply material for spreading under the cocoa trees. In some places the ashes are most carefully saved, mixed with soil, decayed leaves, and rotted cocoa husks and used for raising new plants and for supplying vacancies.

Danger from vacant spots in the farm.—Exposure of the stem of the cocoa tree to much sun is harmful, therefore see that vacant spots are filled, or the surrounding trees may be gradually weakened. Filling these vacant spots is generally more difficult than when the farm was first planted. Therefore, it is wise to dig holes two feet long, two feet wide, and two feet deep. It would be better to make them even larger than this. The holes should be filled with the decayed material from the village refuse heap mixed with soil. Sow three seeds : put in a small cocoyam plant to protect the young cocoa plants, and don't forget to remove the two weakest cocoa plants when the plants are two feet high.

A better way is to have a nursery of young plants, growing in baskets of fine rich soil, ready to be planted out at the beginning of the rainy season. This may here be thought too much trouble, but in the thrifty Portuguese colony of San Thomè, on the large estates, thousands of plants may be seen in palm leaf baskets, a foot deep by 6-8 inches wide, waiting to fill vacancies, or to replace weak or worn out cocoa plants.

Disposal of the husks.—On another page (pp. 94) in this number, is to be found a description of a disease capable of causing much injury to cocoa pods, whilst on pp. 6-8 of Number I, farmers were warned of the grave danger of leaving any dead or diseased pods on their trees. These empty husks contain much food, which the roots of the cocoa trees want. In the past, this valuable material has been wasted here, simply thrown into a pit on the farm, or allowed to accumulate in large heaps, of which no use was made. One estate method is to have large pits, some six feet deep. These pits are covered with a roof. The husks are thrown into layers and covered with bush or stable manure, sweepings of compounds and kitchen refuse. When decay has started, the material from the pit is used, during the early rains, and placed in holes between the cocoa trees as manure, or used in the holes for supplying vacancies. Another method is to place the fresh husks in shallow trenches dug between the rows of trees. As soon as one trench is filled with husks, it is covered with soil, the removal of which makes another trench ready to be filled. This method, not only disposes of the husks, but it has the advantage that tillage or surface soil cultivation is given to the trees. It means work, but farmers here have now to realise that the preservation of these cocoa farms, if they are to continue to give them good crops, means more, and still more, work than in the past.

Mealy Pod Disease—A new Foe to Cocoa.

By R. H. BUNTING, F.L.S., Government Mycologist.

In an earlier number of this Journal (Vol. I, pp. 59 & 60) reference was made to the "Mealy Pod" disease of Cocoa—a disease which, unlike many of the more common fungous diseases occurring here, has not been recorded from other cocoa-producing countries.

The fungus which causes the disease is to be described elsewhere under the name *Trachysphaera fructigena*, and can be found on broken cocoa-husks, and on young and old cocoa pods in the majority of cocoa farms. In fact, it is so common here that one would expect it to have been frequently recorded from countries where the same conditions permit the same fungi to cause the same damage to the same crops as they do on the Gold Coast. It may be that the disease does occur in those countries, but does not cause sufficient damage to be worth recording.

If this is so, then it is apparent that our cultivation and farm-sanitation are not up to the standard of those countries which are our competitors in the cocoa market, and this is another argument in favour of those farmers-unfortunately far too few in number—who view with apprehension the menace which fungous diseases offer to the cocoa industry.

Why it occurs so commonly here :—

If one examines fairly new heaps of cocoa—husks, which are frequently left on the spot where the beans were extracted, one may expect to find the fungus, flourishing as a mealy, white to pinkish, mass of spores, on the broken pods.

A portion of such a heap is illustrated in Fig. A. of Plate III ; the photograph, from which this illustration was made, shows that every piece of pod was bearing countless myriads of spores, each of which was capable of transmitting the disease, given favourable conditions.

PLATE III.



B

A

When these externally-borne spores have been carried away by wind, rain, insects, animals, etc., to propagate damage elsewhere, microscopic examination of the husks will reveal the presence of another form of spores which are constructed in such a manner that they can tide over uncongenial conditions, that is to say, they are able to survive a drought such as would kill the external spores, and they are thus able to await a favourable opportunity to work similar destruction as the external spores would have effected had they been able to survive.

It is because heaps of broken pods are left on the surface of the ground under cocoa-trees, exposed to the weather and to the visits of insects and animals, that the fungus is such a common object of the local country-side.

The broken husks would provide just the right kind of food for the cocoa trees were they buried so that the roots could benefit by them. But this is rarely done here. The majority of farmers would appear rather to risk the loss of their crop, than to benefit it by the very desirable expenditure of the little energy required to bury broken pods.

The damage done by Mealy Pod :—

There are a very large number of fungi which live in considerable quantities in local cocoa farms and even on broken pods but which do no damage to the crop. The "Mealy pod" fungus might be classed with them, and allowed to flourish as much as it desired, but for the fact that it is found on living pods attached to the tree. One would not be so exercised about its presence on the pod if it would confine its attention to the outside; but it penetrates wounds, however minute, and not many of the pods in a farm escape being wounded by some such means as insects, neighbouring branches, animals, etc. It has, so far, never been found in the fully developed beans of affected pods, so that we might perhaps let it remain uncontrolled, if it would restrict its activity to fully developed pods, **but** when once inside a young, undeveloped pod, it quickly destroys the beans which otherwise would have brought money to the farmer. Therein lies the danger of leaving "Mealy Pod" disease to flourish as it will. If it attacked all the young pods in a farm, that farm would provide no produce for marketing. There is also a possibility that it may contrive a means to increase its destructive powers by penetrating healthy, uninjured pods. Already it has been found capable of entering unwounded healthy pods, which were detached from the tree.

In any case, one may be assured that the "Mealy Pod" fungus will not decrease its activity, and that its increased activity will decrease the farmer's portion of the produce which he now shares with diseases, *unless* the farmer attempts to control the disease.

How to combat " Mealy Pod " :—

Both the illustrations on Plate III. show how to propagate the disease; in Figure A. the unburied heap of broken pods is not only disseminating myriads of disease-seeds from each piece of husk, it is also laying up countless numbers of spores which will await the next wet season to propagate the disease; in Figure B a pod which has been attacked by an animal and thereby rendered useless to the farmer, has been allowed to remain on the tree, it is covered with characteristic masses of spores which are most favourably placed for spreading the disease, whenever the slightest breeze comes along, ultimately the pod will decay and in wet weather the internal spores will continue the destructive work on other pods.

It does not require much labour to bury cocoa husks; *this operation is necessary to prevent the spread of all pod diseases and to provide food for the trees.* Nor is there much energy required to remove and bury diseased pods which occur on the trees; pp. 6-8 of this volume showed how necessary it was to do so in the case of "Black-pod," *it is also necessary to do so to prevent the increase of Mealy pod.*

If a person dies in a village, the body is buried in spite of every-one's sorrow at losing sight of him or her. If the body were unburied the remaining people would become sick.

If dead cocoa-pods are left lying about a farm one may just as truly expect the remaining pods to become diseased and useless. Therefore :—

- (1) Remove and bury all diseased pods from cocoa-trees.
- (2) Bury all husks as soon as the beans have been extracted.
- (3) Keep the trees in a good state of cultivation so that they can do their share of warding off disease.

PLATE IV.



From a Photograph by Capt., H. A. DADE, A.R.C.S.

PLATE V.

WHAT SANKONUABE OR AKATE DOES.



Regard this Bug as a
Friend because he makes
you visit your farm
frequently to look for him



KILL ALL SANKONUABE.

From Drawing by Mrs. PATTERSON.

NOTES ON SOME OF OUR COCOA PESTS.

By W. H. PATTERSON (Entomologist).

At the recent Agricultural Show large posters were displayed showing some of the pests and the chief diseases of our cocoa farms. It is hoped it will be possible for these posters to be reproduced in colours, and used in all the schools of the cocoa-producing area, in order that the farmers of the future may be equipped with the necessary knowledge to enable them to maintain their farms in a sound healthy condition.

As some time may elapse before the posters are ready for distribution, those illustrating some of the insect foes are reproduced on a small scale in this number, together with brief notes.

Sankonuabe the Chief Pest.—Plate IV. represents a young cocoa tree in the Aburi gardens upon which a few Sankonuabe, Akate bugs, or bark sappers were placed. When chosen for the work, the tree was perfectly healthy and free from any signs of injury. In a few weeks many of the leaves had fallen off: some were dried, withered and hanging on to the branches in a useless condition. The whole tree appeared to be dying.

At first glance the branches seemed as though they had been knocked with a hammer, thus producing bruises without actually breaking the skin or bark. A branch cut from X is shown more clearly in Plate V., where at A the bark is indicated smooth, as it is always found in healthy shoots. Sunken patches in the bark are seen at B. These are areas of the bark which have been sucked by the bugs. In order to more fully reveal the damage done, a flap of bark, extending right down to the wood was lifted at C. A brown discoloration extended through the bark down to, and into the wood. The same is also to be seen at A in the photograph in Plate VI.

Not only are the branches weakened by the loss of sap used by the bugs as food, but a poison is most likely injected into the wounds at the time of sucking. The result is the death of the bark in the sucked area. When the wounds are very close together the branches die. Trees, three to four years old are first attacked, and when the attack is a bad one the trees may be killed nearly down to ground level. Occasionally trees left too long in nursery beds are attacked. Where the damage is not so severe, the narrow strips of uninjured bark between the wounds continue to grow. The early stage of healing is shown in the central piece of stem in Plate V.

Unfortunately, such wounds are never quite obliterated. They form what was formerly called here "dry canker." For years these old scars remain on the branches, see Plate VI., B and C, and in later attacks they afford hiding places for the young bugs. In fruiting trees the bugs may also be found between the pod and the stem of the tree. The position of the pod adjacent to the stem may be extensively sucked, as may also the base or neck of the pod. Such an injured pod is shown in the upper left hand corner of Plate V.

Graham first called attention to the damage done to cocoa here in 1908, though Von Faber appears to have described one such bug as injurious to cocoa in the Cameroons as early as 1902. Since then two closely related insects have been known here under the name of Sankonuabe. The young of both are very similar but the brown adults in one species (*Sahlbergella singularis*) are speckled with lighter coloured brown spots, whilst in the second species (*Sahlbergella theobroma*) the colour is uniformly dark brown approaching black.

At least one species is known in the French and Belgian Congo, Cameroons, Nigeria, Togoland, Ivory Coast and Fernando Po.

The Insects.—The adults are rather less than half an inch long and slightly less than one quarter of an inch wide. During the day the adults and young are sluggish. The adults do not readily fly, and then only from tree to tree. Being brown in colour, the insects are not easily seen on the bark.

The eggs.—Are cylindrical in shape, pearly white in colour, and the upper end of each terminates with two fine hairs. The eggs are embedded in both green and woody shoots as well as the base and stalk of the pod. Occasionally they may be found in the base of the leaf stalk. The eggs are not easily seen and are possibly thus protected from natural enemies which might injure them by laying their eggs in them. Only the minute hairs at the end of the eggs are visible on the outside of the part containing them.

Hatching.—Takes place in about 14 days. The young or nymphs start feeding at once and continue to do so for the rest of their lives. They are covered at first with spines which terminate in minute drops of moisture. They become adults at the end of one month, during which time they have changed their skins five times, for it must be remembered that their skins are not very expansive as in the more highly developed animals. Therefore as soon as a certain stage of growth has been made, the skin of the insect bursts; another more elastic one having formed beneath. The insect is thus able to go on growing until this skin in its turn becomes too tight. No additional growth is made when the winged stage is once reached.

The adults may live for two months or longer.

General Habits.—Feeding takes place chiefly at night, though in dull weather the insects may be seen feeding during the day. All stages of the insects may be found at one time. Usually they are to be seen in small colonies containing as many as 13. Isolated specimens may also be found scattered over the bark after having been disturbed. One favourite hiding place is at the base of sucked shoots which have already withered. The close resemblance of the insects to the bark of the tree is their great safeguard, and there is no need for them to go down into the soil at the base of the tree to hide, as has been asserted by some observers.

Other Food Plants of the Pest.—Up to the present it has only been occasionally found feeding on young trees of silk cotton (*Enyenga*, *Enyena*, *Enya*) (*Eriodendron anfractuosum*) and on two occasions on the stems of cotton plants (*Gossypium*), very rarely has it been known to suck pods of Cola. And has been found on young shoots growing from posts of silk cotton used as supports for shade on nurseries in the Aburi gardens, as well as on similar posts of the same plant around village compounds in various parts of the country, but it is never plentiful in such situations.

Cocoa was imported into the Gold Coast in 1879 from Fernando Po and it has been suggested that this pest must have been introduced with the material. Had plants of cocoa been imported, they would of necessity have been comparatively small ones, on which there is little likelihood of the insects being able to support themselves. Even had the insects been so imported, they must have had to find other food shortly after arrival, a somewhat remote possibility. They would have had a better chance of successfully establishing themselves if the plants had only contained their eggs whilst in transit from Fernando Po to this Colony. On the other hand, the evidence seems to show that pods, and not plants, were means by which the cocoa was introduced. This much lessens the possibility of the pest having been imported, as the young insects would have had to find new food immediately the broken pods were thrown away on the extraction of the seeds for sowing, a still more difficult task, though not an impossible one, than if the eggs or young had been on cocoa plants.

The writer recently examined many of the older plantations in Fernando Po and could find little evidence of Sankonuabe injury on the trees, and after much searching only three specimens of the bugs were found on a pod.

PLATE VI.



Sankonuabe Wounds.

From a Photograph by Capt., H. A. DADE, A.R.C.S

Damage done by the Pest.—This has already been described in part. The damage appears to be greatest on very coarse gravelly or laterite soils ; soils which at first do not appear favourable to the growth of cocoa, and which are not likely to be good enough for its successful cultivation after the exhaustion of the organic matter derived from the forest growth preceding the cocoa planting.

Young trees may be repeatedly attacked as soon as new branches have replaced those previously injured and the fruiting delayed for three or more years.

Older trees may harbour the pest for years. Though the damage on larger trees does not appear so pronounced, such trees are a menace to new farms in the district. In addition to this, the numerous wounds, such as in Plate VI., tend to shorten the life of the trees, especially where the soil is not in the favour of the trees. This, and the fact that the output of cocoa is lessened by at least 25% should cause farmers to make more real efforts to check the work of this bug.

Sankonuabe means "It is hopeless, we cannot control it: let the land go back to oilpalms." Farmers have required a "medicine" which can be put once on the trees and which will keep them clean ever afterwards:—an impossibility so far as present knowledge of plants and pests is concerned.

Means of Control.—These are (1) spraying with such "contact" mixtures of as kerosene emulsion or preparations containing nicotine. (2) "Fallowing" of young plantations. (3) use of natural enemies or the biological control. (4) Searching for and brushing the insects over with kerosene preparations. (5) Scorching the insects with small torches as explained under "cocoa mosquito." (6) Hand-picking or crushing the insects on the trees. (7) Destroying all insects found on the pods when reaping is done.

Spraying has to be done so well that each insect is thoroughly covered with the mixture. The insects cannot be killed by covering their food plant with some distasteful substance. Their bodies must be covered. To thoroughly cover the insects is not an easy task with cocoa trees. Spraying is costly. In 1913, it was found that in the Aburi area kerosene emulsion would cost as much as £5 per 1,000 gallons. For costs, see also under "Cocoa Mosquito." Spraying has to be repeated each time live insects are found, therefore the work is useless unless all farms in an infested area are sprayed at the same time. This means thorough co-operation among the farmers.

Fallowing consists of allowing young, badly infested farms to revert to bush for several seasons. As soon as fruit is discovered the bush is cleared away from such trees as may have survived this treatment. The method is uncertain and can only be employed in a country containing much uncultivated land to enable planters to form small farms here and there in the bush. It is possible better results might be obtained by planting good shade at the same time as, or before the planting of the cocoa.

Natural Enemies have been of immense value in the control of insect pests in some countries. Unfortunately, so far, the Sankonuabe has not been found to have many enemies. One was recently found in Ashanti by Mr. G. S. Cotterell, the Assistant Entomologist, but not in sufficient numbers to at once suggest it might play an important part in the control. There is no reason, however, why parasites should not be found, particularly where the pest can be found living on its original food plants, that is, those which it used before attacking cocoa. This may mean a long and tedious search, perhaps extending over some years in this and in neighbouring countries.

Mayne in the Belgian Congo has found the *best remedy* to be hand-picking, or brushing the insects on the trees with preparations of kerosene, soap, and water i.e., kerosene emulsion.

This means repeated examinations of the trees at short intervals, and as with all insect pests, *persistent and co-operative action*.

THE COCOA MOSQUITO.—This name is somewhat misleading as the insect is not a two winged fly (*Diptera*) breeding in water as mosquitoes do. It is a four winged, plant-sucking bug *Rhynchota—Hemiptera*) breeding on plants and feeding on them. Farmers have recognised in this insect a resemblance to true mosquitoes: a similar and closely related insect is known in Ceylon as "Mosquito blight," in India as "Tea mosquito," whilst in Ecuador, one cocoa pest is called "Mosquilla" (*Monalonion dissimulatum* and *M. atratum* Dist.), which is also a near relative of *Helopeltis*, the scientific name of our cocoa mosquito.

The Gold Coast "Cocoa Mosquito" (*Helopeltis Bergrothi*) was first noted in the Anum district by Dudgeon in 1909. It has since been found widely distributed throughout the Colony. *Helopeltis* are also found on cocoa in the Congo, Fernando Po, Uganda and San Thome as well as Java.

The Insect.—The adult is about three-tenths of an inch long; the body reddish-yellow in colour with brown wings. The length of the feelers or antenna makes the insect conspicuous as does also the pin-like, vertical outgrowth from the lower part of the thorax, or portion of the body behind the head. The insect does not readily fly, but prefers to hide beneath the leaves when disturbed. The flight is slow and laboured. The female has a strong ovipositor, or egg placer, to enable her to insert the eggs in soft green shoots or under the skin of cocoa pods.

The eggs are pearly white in colour and elongated, about one-twenty-fifth of an inch in length. They are furnished with two fine hairs which project into the air. These are the only parts visible on the outside of the shoot but they are not easily detected amidst the hairs of the shoot. About thirty eggs are laid by each female. These hatch in fourteen days.

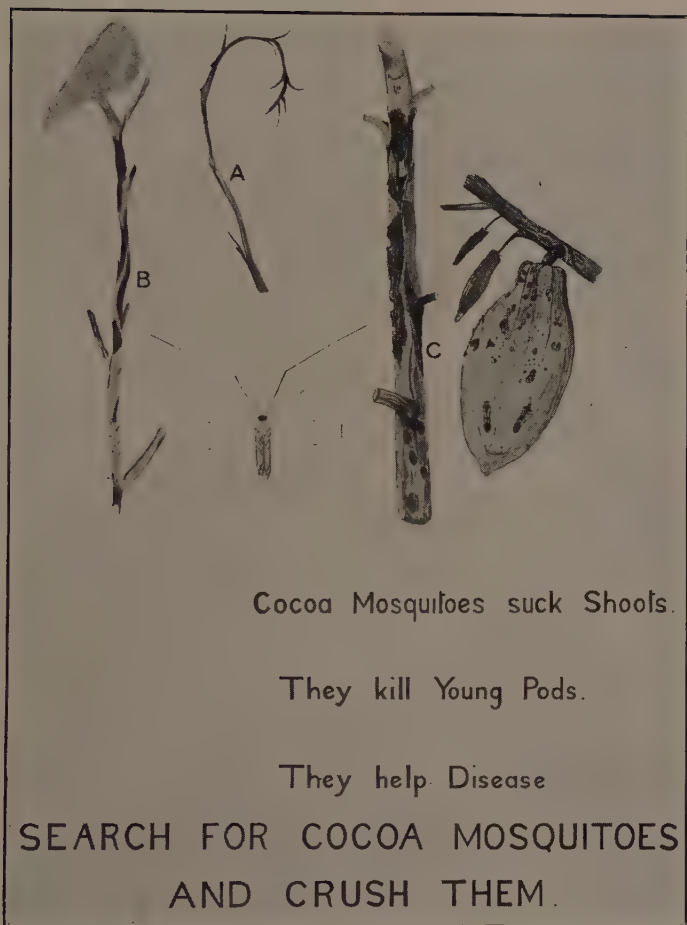
The young or nymphs start feeding at once. At first they are very pale green in colour and not provided with the dorsal or back outgrowth. The skin is changed after a few days. This is done five times before growth is complete. The time required for this is one month. Feeding is done from the time of hatching till maturity, there being no pupal or so-called resting stage in bugs. Feeding of course is also done vigorously after the insects have reached the winged stage, as many farmers know to their cost. Pairing takes place soon after the formation of wings. The adults live for about one month, though some have been kept for three to four months in captivity. On the poster one nymph was shown near the lower end of the pod with two adults but these do not appear very clearly in Plate VII.

Damage done by the insects.—With cocoa the soft, green, newly-formed shoots, as well as pods of all ages, are used as food by this insect. When very young shoots are much sucked they wither, turn brown and die as at A. In bad attacks the whole tree may be covered with dead shoots—a form of "Die-back." The blades of the cocoa leaves are not sucked. Very occasionally the midrib or central vein may be sucked as well as the leaf-stalk. In plants other than cocoa, the leaves are the chief portion sucked.

The wounds are similar in appearance to those of Sankonuabe when the latter has fed on green shoots. When the wounds are scattered the branch recovers as at C; healing takes place around the wounds, though the wound sites may be traceable for several years afterwards.

Very young pods.—When much sucked, turn black and die. This does not happen with pods of three or more inches in length. On pods the wounds are round, and at first nearly black in colour, but under certain weather conditions they quickly become coated with a grey covering of dead cells. Sankonuabe wounds are chiefly confined to the neck or true base of the pod. Those of cocoa Mosquito are scattered over the whole surface; they are also smaller than those made by "big bug" see Plate IX.

PLATE VII.



From Drawing by Mrs. PATTERSON.

Whilst very often the insects may not appear numerous, each one is capable of making many wounds. In one trial, a female, caged on a cocoa pod, made 84 punctures in 14 hours; in another case, two adults made 264 wounds on two leaves of *Acalypha hispida* in 24 hours.

When it is remembered the "Black pod" disease may destroy even unwounded pods in addition to wounded pods, it would seem well for farmers to allow such an insect as cocoa mosquito to do as little damage as possible.

Food Plants of the Pest.—As there are times when the cocoa trees have no young shoots and no pods, it may be asked how the insect manages to carry over the period of food shortage. Formerly, it was supposed that special eggs were laid, which were capable of remaining dormant and not hatching till food become plentiful. This is not so, but a few of the cocoa mosquitoes manage to survive in moist shady places, living upon leaves and stems of various plants other than cocoa.

The cocoa mosquito has a very wide range of food plants. As many as sixty different plants are known to be used here by this insect. The chief are red peppers (mako), guavas (gua), garden eggs (ntorowa), mangoes (manno), hog plums (atoa, atawa), *Acalypha*, sweet potato (ntomo), Avocado pear (paya), cotton (asawa), *strophanthus gratus* (omatwa-nini), castor oil (adedenkruma) Bengal beans, cucumbers and Fish-poison fwe (twi) nwe (ga), *Tephrosia vogelii*

Means of control.—Dr. Van Hall in "Cocoa," 1914, the best review of cocoa cultivation yet written, says that in Java women and children catch the insects on sticks. A small ring of bamboo is fastened on the end of the stick and on this ring spiders' webs are fastened by passing the ring through the web. The insects stick to this cobweb. (Here the very sticky, or viscid web of the big yellow and brown spider would do admirably). Sometimes the juice or sap of the stem of the jak fruit tree is used on the sticks. Birdlime would do equally well.

This method, which was also used at one time in Ceylon, would be useful where the insects are numerous and not easily reached by the hands; otherwise, they might be simply crushed on the pods, especially where the work is done by the farmer and his family. In the case of employed labour, it is necessary for the dead insects to be shown at the end of the working period. The above authority also describes the use of torches as follows :—

For this purpose, the labourers use bamboo sticks filled with kero ene or some similar oil and provided with a wick of cotton. The fruits are treated with this torch and a great number of *Helopeltis* are killed. Some fly away in time, however; others are not reached by the fire, and a still larger number on the twigs and branches are left unharmed. It is worth mentioning that the fruits are not damaged in any way by this method. As the insects like to retire during the hottest hours of the day into shelter, places on the branches and under the leaves, the best time for catching, as well as for burning the *Helopeltis*, is the early hours in the morning.

Spraying has not been generally successful against this pest. As each insect has to be covered with the mixture used, unless the insects were particularly numerous, the spraying could not be advised.

It is worth noting here that in certain parts of San Thome where the planters may have to spray their pods as often as three times a year to protect them from "Black-pod" disease (*Phytophthora*), the Bordeaux mixture is said to also protect the pods from cocoa mosquito.

Natural Enemies and Parasites are of no value at present, so far as is known in the control of this pest.

In India, experimental work tends to show that thorough cultivation and good drainage with an abundance of potash in such a form as to be easily absorbed by the tea plant play a most important part in the control of their Tea Helopeltis. Some of the soils in the Gold Coast may prove to be deficient in potassic manures (those supplied by wood ashes) but as years may elapse before much soil analysis can be done to any extent farmers will have to depend chiefly on hand collection of cocoa mosquitoes, together with the destruction of any wild plants upon which the insects may be found breeding in the vicinity of the farms.

Cocoa Thrips.—Plate VIII. Destructive as 'Sankonuabe' has been to our cocoa, the insect known as Thrips may prove even more dangerous. Dr. Reyne has recently shown that the loss of 2,269 acres of cocoa trees, or one-seventh of the total area, in 1902-1908 in Surinam was not due to the "die-back" fungus (*Diplodia*) see also "Some Causes of Cocoa Die-back" pp. 137-140 of Vol. I, but to the work of this Thrips preparing the way for that fungus.

Cost of the Pest.—This is the pest which during the last few years, has caused much trouble to cocoa estates in San Thome. There the planters experienced several droughts of unusual severity. The banana shade was crippled owing to the dry atmosphere and lack of soil moisture.

The forest trees had previously been too much reduced. Forest trees may not induce a greater rainfall: their great value is in their roots retaining the water in the soil: preventing it from too quickly rushing off the surface: enabling the water to be available for a longer period, and at the same time maintaining a cool, moist, humid or damp atmosphere round the cocoa plants.

As a result of the Thrips attack 50 per cent. of the young cocoa trees were killed by the rapid increase of the insects. Older trees also were greatly damaged by the exposure of the stems and the soil to the sun favouring the Thrips. The immediate result was shown that for the period 1917-1921, only 137,234 tons of cocoa were exported, compared with 151,947 tons for the period 1912-1916.

The Insect.—The insect is small, the adult being only one-twentieth or less of an inch in length. It is black in colour, the wings are generally folded and it does not readily fly away.

The young thrips is noticeable on account of the red band or girdle of colour around the pale green body: hence one of its names—*rubro-cinctus* or red banded.

The young may be detected on the foliage and on cocoa pods by the minute drops of moisture which are carried by the insects before they reach the winged stage. The end of the abdomen is carried in the erect position. The liquid excrement is held and carried at the end of the abdomen by means of a tuft of six hairs.

Damage to Cocoa leaves.—When cocoa is attacked the insects live in colonies on the under surface of the leaves and on the pods. Most harm results from the injury to the leaves. Small wounds are made to enable the insects to suck the sap. These wounds cause brown patches. When many wounds have been made the leaves fall off. Healthy cocoa leaves should live from four to six months. Leaves badly injured by Thrips live only three to four months. Leaves are made at the expense of the food (chiefly starch) in the stems. If the leaves do not live their full time, not much starch is made and stored in the branches and stems with which to make new leaves. Therefore, each succeeding flush of new leaves becomes smaller. (The branches are not used as food by the insects) The youngest branches as shown in Plate VIII, die as the result of this starvation. This death of branches increases until the insects are removed and the tree given such treatment as will enable it to become strong and vigorous.

Artificial production of similar damage.—Exactly the same condition may be obtained by taking a perfectly healthy cocoa tree and repeatedly picking off the leaves.

PLATE VIII.



From Drawing by Mrs. PATTERSON.

The Pod Damage.—Pods, three parts grown may be attacked. The numerous wounds are healed over with a thin layer of brown cork. When mature, the pod does not change colour but remains brown. The pod marked by the arrow on the left of Plate VIII was quite brown. On gently scraping the skin the pod was found to be green. The larger pod was yellow under the brown.

Reapers are unable to easily tell ripe from immature pods. Therefore, green pods may be gathered too early, or ripe pods may be left too long on the trees. The cured cocoa may be poor owing to the mixing of ripe, overripe and immature beans.

How the Insect Lives.—The eggs are laid in the leaves or under the skin of the pods. The life of the insect is a short one. The eggs take from 10-13 days to hatch. The larval stage occupies 9-10 days. This is followed by a prepupal stage of one day and by a pupal condition lasting two days. From egg to adult covers a period of 22-27 days. The adult may live for a month.

Conditions favouring the Insect.—These are chiefly

- (a) Too much exposure to light.
- (b) Prolonged drought
- (c) Exposure to wind.
- (d) Lack of drainage and unfavourable soil conditions for the plant.

The cocoa thrips favours light, hence its name *Heliothrips* or sun thrips, the full name being *Heliothrips rubrocinctus*. This excessive light for the cocoa plant may be easily produced by excessive pruning or by the removal of too much of the shade trees.

How to Get Rid of the Pest.—The insect may be controlled by spraying with (a) Bordeaux mixture, (b) Bordeaux and arsenate of lead, (c) nicotine, (d) nicotine and soap, (e) nicotine and Bordeaux, (f) milk of lime.

Disadvantages of Spraying.—(a) Spraying is costly.

In 1913, in Trinidad, where the cocoa farm labourers are more proficient than in the Gold Coast, Rorer gave the following details. (1) a barrel spraying outfit at £10 or a set of compressed air knapsack sprayers costing about £20, under favourable conditions, would spray about 500 trees per day. (2) one man should spray at least 75 trees per day or 100 small trees, provided the facilities were good for the work. (3) Each tree required three-quarters of a gallon of spray mixture on an average. (4) Bordeaux mixture cost 33s. per 1,000 gallons. (5) If 80 lbs. of arsenate of lead were added to the Bordeaux mixture the cost amounted to 66s. (6) Nicotine sulphate wash cost 40s. per 1,000 gallons and kerosene emulsion a still higher sum. It was then estimated that the maximum cost would be 60s. per 1,000 trees for each application, though spraying with Bordeaux mixture alone would cost less.

(b) Spraying may have to be done repeatedly or at least after the formation of a new flush of foliage.

(c) It is difficult to get spraying done thoroughly.

(d) Spraying is unable to get rid of the causes which particularly favour the increase of the pest.

Spraying is necessary to reduce the attack and to assist the plant to regain its vigour :—

Plants can regain vigour by (1) sound cultivation.

- (2) protection from wind and from sun by windbelts and shade trees :
- (3) Shading exposed soil by cover crops of sword beans, pigeon peas and cow peas
- (4) feeding the soil by mulching and surface cultivation.
- (5) avoiding exposure of the cocoa trees by excessive pruning and by rapid reduction of shade trees
- (6) removal of excessive water from the soil by drainage.

It may be asked why attention is now drawn to Thrips which has not yet done much damage here. The answer is that Thrips can hardly be described as a pest in any cocoa-growing country but rather that *the insect is a friend of the planter* because it indicates to him that one or more of his methods of cultivation is wrong, and that he must correct it if he is to succeed with cocoa.

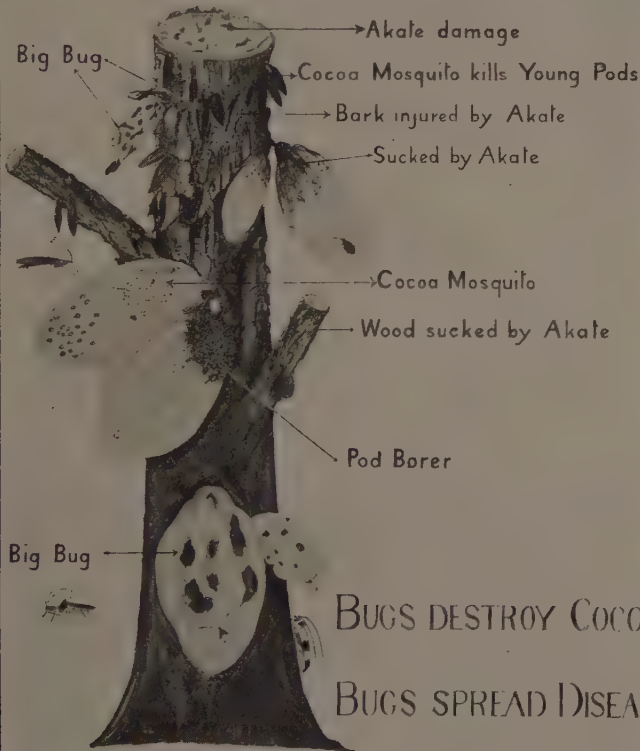
San Thome planters have still a hard struggle to conquer the pest but they are feverishly planting shade trees and windbreaks.

Gold Coast farmers would do well to benefit by this warning ; avoid a pest which is scattered in the colony and which must cause injury if given a chance. Prevention is cheaper than cure in this instance.

Plate IX represents in a diagrammatic way some of the chief insects injuring our cocoa. The poster was made to enable farmers and others to recognise easily the various types of damage done by different pests. The work of the pod borer the gray moth pod borer (*Charcoma stictigrapta*, *Hamps*) and the big bug of cocoa (*Homoeocerus pallens*) will be described later.

PLATE IX.

INJURY SOME INSECTS DO.



BUGS DESTROY COCOA

BUGS SPREAD DISEASE

DO YOU CONTROL BUGS

From Drawing by Mrs. PATTERSON.

The Biological Control of Insect Pests of Crops.

By G. S. COTTERELL, D.I.C., A.R.C.S.,
Assistant Entomologist.

Until a few years ago practically all controls of insect pests were obtained by artificial methods. In only few cases has the value of the crop justified such methods from the farmer's practical point of view, and in most countries conditions are entirely against the use of any but the most simple methods of artificial control. In the Gold Coast, any artificial methods such as spraying and dusting with insecticides for controlling our pests seem to be entirely out of the question, owing to costs, lack of co-operation amongst farmers and especially to the fact that ordinary cultural operations are not carried out, let alone any recommendations which may be made to lessen the attacks of pests and diseases.

Biological control, or the use of natural enemies of insects to control them, does away with a great deal of these difficulties and only entails the establishment of these enemies which can be done by officers especially trained for this purpose, and without anything but the smallest help from the farmers.

A large amount of work has been done during recent years in studying pest control from the biological point of view. All insects are preyed upon by other insects and these in turn may have others preying upon them. As Dean Swift says:—

“ So nat’ralists observe, a flea
Hath smaller fleas that on him prey
And these have smaller fleas to bite ’em
And so proceed *ad infinitum*. ”

In other words, a perfect balance is kept under natural conditions in the animal world.

How the Natural Balance is Changed :—

The cultivation of crops by man (increase of food-plant), alterations in climatic conditions by deforestation etc., and the importation of plants from other countries help to destroy this natural balance, and a new balance is obtained with these new conditions as factors. An insect may exist in a country feeding upon a particular plant in that country. A new plant may be introduced and grown extensively and this insect may prefer this new plant to its old food plant. The clearing of bush to grow this new plant affects the climate, perhaps making conditions more

favourable for the increase of this insect or it may be unfavourable to the corresponding increase of the natural enemies of this insect with the result that in the new balance obtained this insect becomes a pest. Man attempts to create a new balance by control measures against this pest. These control measures become a factor in the new balance, and must be kept up in order to maintain this balance unless a total elimination of the insect is obtained, which rarely happens. By importing natural enemies from other countries which are there effective, a factor is obtained, which as a rule when once established, keeps itself going without the help of man.

Introduction of Pests :—

In the great majority of cases, pests are insects imported as nursery stock or in plant seed. These insects are without their natural controls, such as parasites and predators, which in the country to which they are indigenous, keep a considerable check on their increase. A great deal of work is being done in importing parasites and predators from countries where the insect is found but is of no great importance, usually its native country, and also on importing parasites and predators of allied species.

Necessity for study of the habits of parasites :—

This work necessitates a very close investigation of the habits of the insect which it is proposed to import in its native habitat, with a view to discovering what it might do under changed conditions. This is very important, as an imported parasite may, for instance, become a secondary parasite of some plant-feeding insect, thereby neutralizing the efforts of the primary parasite. Again, a natural enemy, particularly a predator, may change its habits from a predacious one to a herbivorous one when introduced and thus become a pest itself. Some countries have been particularly unfortunate in this way : Australia for instance, which absolutely forbids the importation of any insect, excepting in very exceptional cases where a natural enemy is introduced, and then only after the most rigid tests on other crops have been carried out, to ascertain whether it will change its habits.

Some of the valuable work done :—

The United States of America are probably much further ahead of any other country in developing this line of work, chiefly because the Government realises the very great importance of insect pests in that country and is not afraid to spend money on experimental work and of establishing insectaries in a number of

different countries to collect and study possible controlling insects and shipping these back in suitable numbers and in a proper stage to stand the journey. I paid a visit to the United States during my last leave, and under the direction of the Federal Bureau of Entomology I was able to study entomological methods, particularly regarding biological control, first hand.

The importation of parasites of the Sugar-cane moth borer (*Diatraea saccharalis*), a serious pest in Southern Louisiana and other sugar-growing districts, has been done with likelihood of successful results. A Tachinid parasite (*Euzenillipis diatraea*) was imported from Cuba in 1915, but owing to the adult parasites being spread over too wide an area no recoveries *i.e.*, of the insects bred in the fields, were made until late last year, to show that it was making any attempt to establish itself. It was thought the parasite could not stand the changed climatic conditions, or that it might have been destroyed by a hyperparasite or by a predator. It was also possible that its stages did not coincide with the stages of its host suitable for parasitisation. However, after the recent recoveries, it is hoped that it may established itself sufficiently to form a considerable check on the spread of its host. An entomologist was sent to Cuba to collect this parasite and at least three attempts were made before a successful shipment was obtained.

Another parasite, a Braconid, has been imported, but as yet no data have been obtained on its efficiency. It lends itself particularly adaptable to rearing under laboratory conditions. During my visit it was being reared in large quantities and liberated in the field.

In California, pest control by means of parasites and predators has reached its maximum development. The cost of fumigating citrus trees against scale insects and Mealy Bugs has been enormous and a cheaper method of control was essential. The Black Scale (*Saissetia oleae*), is the worst of these scales. In 1918, *Aphycus lounsburyi*, a parasite, was introduced and reared and maintained in sufficient quantities to keep a stock. *Scutellista*, an egg parasite, had also been introduced and also a Coccinellid predator *Rhyzobius*, on all larval stages. This made a sequence of natural enemies working on different stages of the host.

The Black Scale has two distinct types of development. On the coast, all stages of the host are found at the same time, these being what is called "an uneven hatch." Inland, where by far

the most citrus is grown, the generations are distinctly separate, each stage, egg, nymph (young form) and adult, being found only at certain periods. This is known as "an even hatch."

Aphycus will only parasitize the older stages of the scale. A considerable period elapses from the egg until the young scale reaches a stage suitable for parasitisation. During this period *Aphycus* cannot support itself in any numbers. On the coast, however, all stages of the scale are found together and *Aphycus* can maintain itself and multiply rapidly. The even and uneven hatch conditions are due to the climatic conditions being different on the coast and inland. On the coast the temperature is much more steady throughout the year than inland.

The method employed now in the inland areas is to establish insectaries in all citrus-growing countries where *Aphycus* can be liberated in enormous numbers and at frequent intervals. Potato sprouts have been found to be a suitable alternative food plant of the scale which can be grown in large quantities and under laboratory conditions. The scales are allowed to feed on these until they reach the proper stage for parasitisation and then *Aphycus* adults are admitted for oviposition.

Cryptolaemus, a Coccinellid predator on citrus Mealy Bugs, is also being reared on a large scale in insectaries in the same way as *Aphycus*. *Cryptolaemus* has been effective on its own but has not been regular in its control, very often it has only become effective after the crop has been severely damaged. It has also a tendency to confine itself to certain trees only. The host Mealy Bugs are reared in large quantities on potato sprouts in the insectary in the same way as Black Scale. Lemons were used at first instead of potatoes, but as these rapidly dry up under laboratory conditions where a higher temperature than the outside is maintained to hasten breeding, they have been discarded. Labour-saving devices, such as the attraction to light of the adult beetles, are used in the final collection for liberation. The beetles are liberated when the Mealy Bugs in the field are in a stage where a maximum mortality is going to be obtained. The larvae also are liberated for use in the field. The latter are transported on pieces of sacking which are attached to the trees. Sacking is slung from the walls of the insectary in contact with the boxes in which breeding is being carried on, forming a convenient place for *Cryptolaemus* to pupate and facilitating transport for large numbers of pupae to other rooms or insectaries.

The Alfalfa or Lucerne weevil, *Phytonomous posticus*, a serious pest in Utah and Nevada, is being controlled to a large extent by the importation of parasites. A laboratory is kept in the South of France where two men are rearing and studying the habits of the weevil there, before shipping them to the United States. Several parasites have been shipped, but only one has shown itself to be of value, that being an Ichneumonid, *Bathyplectes curculionis*, which was imported in 1913, and now shows as much as a 90% parasitisation. However, the Alfalfa weevil oviposits during four months of the year, one female being capable of producing 1,500 eggs. This gives a good chance for the odd 10% to multiply. Besides a very large percentage is parasitized which would otherwise be killed off by the hot dry summers after the crop has been harvested. Considering these factors, it is difficult to say whether the parasite is very beneficial as the last seven years have not been climatically favourable for the multiplication of the weevil.

The Gypsy Moth and the Brown Tail Moth attacking shade trees in the North-Eastern States are also practically entirely controlled by natural enemies. One of the chief controls of the Gypsy Moth is an imported predator, *Calosoma*, a tree climbing Carabid beetle. For this work laboratories were established in Europe for years and a continuous supply of possible enemies kept up.

In the neighbourhood of Philadelphia, a small Scarabaeid beetle, *Popilia japonica*, was accidentally imported on nursery stock from Japan. The beetle and larvae are omnivorous feeders, the former on the leaves and the latter on roots. The first record of its becoming a pest was in 1914, and since then it has spread enormously each year. A laboratory was established and control work commenced. Spraying is impractical and experiments are now being carried out on imported natural enemies. A number of Fossorial wasps (wasps that lay up larvae in a paralysed condition as food for their young) predaceous on the larvae in the ground, have been imported, but with no great success. Natural enemies of allied species are being studied and men being sent to different parts of the world to collect these. There is a possibility of their sending one man to East Africa. Incidentally two species of *Popilia* occur in this country and presumably are kept in submission by natural enemies.

Fungi also useful as controlling agents :—

Citrus in Florida is comparatively free of the same pests that are found on citrus in California. This has been found to be due to the scales being attacked by entomogenous fungi. The climate is much more humid than California and particularly suitable for the spread of these fungi. It would be impossible, however, to establish these fungi in California. Entomogenous fungi play an important part in the control of insects in this country due to our humid climate*. For instance the Cola weevil is attacked to a considerable extent in the adult stage by a fungus. However it takes a considerable time to develop, during which time oviposition has taken place and the weevil would die a natural death anyway. In dealing with parasites and diseases of adult insects, unless the adults are killed before oviposition is finished no success will be obtained. Nematode worms in the bodies of grasshoppers and crickets cause quite a check on their spread in certain parts of the world. This is a line of work which is being taken up in the United States.

Value of Predator versus Parasite :—

A wider scope is provided when dealing with predators when looking for a control, as allied species of one genus have more or less the same habits and thus the predator of one species will probably prey on the other species. Also the prey is susceptible to attacks for much longer periods, e.g., the whole of the larval stage. A

*A good example of this was the coconut leaf scale (*Aspidiotus*) which in 1912 threatened to do much damage to coconuts at Assuantsi. In the following year the pest had been almost killed out by the "Red-headed" fungus (*Sphaerostilbe coccophila*) assisted by two predaceous Coceinellid beetles.

As much attention is now being drawn to fungus diseases of cocoa, in order to allay alarm, it must be explained here that entomogenous fungi are not injurious to plants, because they live solely upon the bodies of insects. Even after killing the insects on the trees, and the diseased, dead bodies remain on the trees, the fungi do not attack the plants.

The fungi must, however, be assisted in their work by the farmers, who must see that their plants are not starved of water or other foods, and not unduly exposed to strong, drying winds. Prominence has recently been given to a serious outbreak of this same coconut scale in Sierra Leone, and there is some reason to think the farmers may be at fault in neglecting some of the plant's requirements and thus assisting their enemies.

†This fungus has been known here for some years and it has lately been determined by the Imperial Bureau of Mycology as *Botrytis* (*Beauveria*) *bassiana*. Here it is not confined to the Cola weevil, but affects a considerable range of insects. On one occasion it was found on Sankonuabe, but it did not spread to others when confined in cages with infected bodies, nor have other Sankonuabe since been found killed by it.

Much research will be necessary before its value is fully tested.—Ed.

parasite on the other hand is practically always dependent on a particular species for host and this host is only suitable for parasitisation at a particular stage, *e.g.*, egg or young larval stage. A parasite, however, lives at the expense of its host, the extermination of one host resulting in the life of one or more parasites, whereas a predator devours its prey but a new generation does not result.

FOREST CONSERVATION.

The Science of Forestry consists in the conservation, improvement and utilisation of forests, and the Forestry Department has been established with the object of gradually inculcating in the minds of the people of this country the principles of the science so that they can apply them with advantage and benefit to themselves and to future generations.

2. The Gold Coast depends almost entirely on agricultural products for its wealth, and it is necessary that its forests be preserved, in order that the humidity of the soil and air may be permanently maintained for the sake of the valuable cocoa crop, and to ensure a sufficiency of timber for local use and for export.

3. It has been said that the principles and practice of forest conservation are not unknown in this country, and reference has been made to cases in which parts of a forest have been set aside for game preservation (by "game preservation" it is presumed is meant "hunting purposes"), the collection of forest produce, and as sacred groves. This is undoubtedly true, but the setting aside of parts of a forest for these purposes has been carried out quite unsystematically and without any regard to the main objects of forest conservation.

4. As has been said on many previous occasions, the fact that a certain area of forest has been declared a "Forest Reserve" does *not* mean that Government thereby becomes the absolute owner of the land. The reserve will remain the property of the Stool to which it belongs by ancient custom, but Government will *show the owners how to work the area for their own benefit, and at the same time how to preserve it in order to retain the humidity of soil and air which is absolutely essential if the cocoa crop is to be maintained.* Unless certain selected areas of forest are thus conserved, the production of cocoa is bound to diminish and ultimately die out altogether.

5. In a country like the Gold Coast the natural forests are constantly being cut down for the extension of cocoa farms, in spite of what the Department of Agriculture has said, and is saying, that there is at present a larger area under this crop than the

population of the country can look after efficiently, and the forests are otherwise being denuded to supply the needs of the Railways and Mines. The *sum total of these denudations*, practised in a haphazard manner, *is tending year by year to decrease the humidity of soil and air*, more in certain parts of the country than in others. It is therefore imperative that Government, whose duty it is to safeguard the interests of the whole community, should take steps to conserve the natural forests, and the Chiefs have been invited to co-operate with the Government, by immediately setting apart areas of existing forests all over the Colony and Ashanti, so that the purposes for which they are necessary may be served.

6. The protection of existing forests, will cost very little and entail a minimum of inconvenience, but if this is not taken in hand now, expensive schemes of afforestation at a later period will be absolutely necessary, if the productive capacity of the country is to be maintained. As it is, expenditure is already necessary to reafforest certain areas, which have already been denuded of forest to carry on the industries of the Colony, and still more necessary in other places where the needs of Agriculture have so reduced the forests as to make the encroachment of Savannah conditions a certainty. (In this connection the *Danger from Forest Destruction on the Ejura and Mampong Scarps* by T. F. Chipp, B.Sc., should be consulted, see p.p 131-136 of Vol. I Ed.)

7. A policy of conservation of forests must be insisted on, unless the far more expensive project of afforestation is to be submitted, to counteract, to some extent, the evil effects of denudation. The expression "to some extent" is used advisedly, because forest trees take very many years to mature and freshly planted areas cannot be expected to have the same beneficial effects as mature and semi-mature forests.

8. It has been said that the offer to Chiefs to establish sawmills in their Stool Forest Reserves is inconsistent with the policy of conservation and that a "Reserve" must be destroyed if a saw-mill operates in it, this is not correct.

The *only timber from the ' Reserve '* which may be brought to the mill for conversion, will be what is known to Foresters as the "annual increment," *i.e.*, the aggregate annual growth made by all the trees in the "Reserve" expressed by the number of trees whose volume equals this annual increment. To give an

example, let us assume that all the trees of every species and of all sizes found in a reserve are readily marketable, and that the average volume of wood put on a single tree in one year is one cubic foot. Then if the "Reserve" contains on an average 300 trees per acre, the total "annual increment" per acre will be 300 cubic feet. This 300 cubic feet of timber will be the maximum amount which may be removed annually per acre from the "Reserve."

9. The problem of finding out what the "annual increment" is cannot be solved by other than trained Foresters, and several other matters, which complicate the problem, can only be satisfactorily dealt with by them. For instance, it is well-known that only certain species of, and above a particular size, are at present marketable. Hence a consideration of the number of these per acre, and of smaller size classes of these species will have to be made, to discover how much material may be removed annually. And finally the scheme of felling and extraction must also be left to the Forester, who would not operate in the same year every acre in a Reserve, but would concentrate on a "coup" and fell trees whose aggregate volume is equal to the "annual increment" of the particular species of trees in the whole "Reserve."

"The Gold Coast News." 27-1-1923.

EFWATAKALA GRASS—WILL IT ENABLE CATTLE TO BE KEPT THROUGHOUT THE GOLD COAST?

A most important article appeared in *Tropical Life*, May 1922, on the possibilities of a particular fodder grass which it was suggested might enable cattle to be kept in Africa free from damage by the dreaded tsetse fly. This subject is of such vast importance that full details of the grass have been published in *Kew Bull. Misc. Inform.* No. 10, December 28th, 1922, from which the following details are taken.

"An interesting discovery that may prove of economic importance was reported by Mr. M. T. Dawe (now Director of Lands and Forests, Sierra Leone), when, in 1921, he made an agricultural survey of Angola. The subject of stock raising has always proved difficult in western Tropical Africa and Mr. Dawe was consequently devoting much of his attention to this subject.

In the course of his travels he noticed a grass which was sought after by domesticated animals for fodder and yet at the same time appeared to be inimical, or at any rate distasteful to the tsetse fly, a scourge against which little headway has so far been made in West Africa. This grass Mr. Dawe recognised as being similar to, if not identical with, the ' Gordura ' of Brazil or the ' Yaragua ' fodder grass of Colombia, in which country he had had practical experience of its utility for fattening stock.

In both South American countries it is considered an excellent green fodder and appears to have the further property of being distasteful to ticks, probably owing to the volatile oil exuded by the hairs on its leaves.

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The specimens from the Lower Congo, submitted to Kew in 1921, by Mr. Dawe under the African names of " Lakamboma " or " Efwatakala," the latter name being in more general use inland where determined as *Melinis minutiflora*, f. *inermis*. From the field notes accompanying the collections the grass is shown to be widely distributed in Portuguese Congo, not only on the plains but more especially on the higher ground from 2,500 to 3,000 feet altitude.

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It is found growing with other and coarser grasses in virgin country, but on abandoned farm land Efwatakala rapidly spreads and establishes itself almost to the exclusion of all other vegetation. There seems no doubt that horses, mules and cattle prefer this grass, especially when it is young and tender, to the other grasses growing in association with it. In Angola from October to the end of May it forms an excellent pasture, and Mr. Dawe reports that in August, which is the dry season, it is often the only grass that retains its verdure on open and exposed dry lands.

But apart from this grass providing a pasturage, Mr. Dawe considers its bearing on the tsetse fly problem to be of even more importance, and it is mainly on this account that it has seemed desirable to give as full an account of it as possible in the *Bulletin*. He fully appreciates that it would not be a practical proposition to recommend dealing with heavily wooded areas or swamp forest, etc. but in those areas which are less heavily wooded, the removal of scrub and trees and the initial planting of the grass will enable it to establish and maintain itself naturally in almost pure stretches. Such districts are found in the uplands of San Salvador do Congo, Canda and Damba, and there would seem to be a definite possibility of converting fly-infested areas to cattle raising lands of first importance. There are suitable areas in Nigeria, the Gold Coast

and Sierra Leone which, could the tsetse fly be eradicated, would enable the cattle industry to be developed to an important degree, not only as regards local consumption, but also in supplying steamers and even an export trade to Europe, whilst the employment of horses in areas, where they cannot live at present, would assist in the difficult problem of internal transport.

The method advocated of introducing Efwatakala is through a rotation of maize, cotton, beans or groundnuts, after which a sowing of the grass will enable it to be established ; isolated trees and palms need not be cleared but the grass could be sown around them.

That the natives of the Portuguese Congo have a knowledge of its insecticidal and preventive properties is shown by their practice of making nests for their sitting fowls and using it as bedding for dogs when about to give birth to young, as it prevents the fowls and dogs being attacked by fleas. They also use the fresh grass for cleaning their clothes made from the fibre of the *Raphia* palm. In South America, it has been stated above, the grass is known to be repugnant to ticks, and cattle fed on this grass are reported to be much less subject to ticks, although the meat and milk of such cattle has not any taint or suggestion of the characteristic odour of the grass, which is not unlike that of curry powder. The properties which render it objectionable to the tsetse fly are not only the strong odour of the viscid drops of oil exuded by the hairs on the leaf sheaths but also that they act in the capacity of a "fly-catcher," and as Mr. Dawe remarks if a big fly like the tsetse be ensnared, how much more would smaller flies be entangled, such as the mosquito, which would tend to shelter in the shady nooks of the grass tufts during the day time.

In contrasting the effect of Efwatakala with *Citronella* grass Mr. Dawe refers to the experiments he carried out in Uganda, where the planting of this grass, but perhaps more especially the clearing of the ground concomitant with the planting, did appreciably diminish the tsetse fly, and again in Ceylon where animals working among and feeding on *Citronella* grass escaped an epidemic of rinderpest which spread over a large part of the Island. Since *Citronella* grass, whose aromatic and oily properties are only noticeable when the leaves are bruised, has proved of service, he maintains that experimental planting of Efwatakala, in which the aromatic and viscid oil is exuded and exposed, is well worthy of serious consideration.

At Mr. Dawe's request, the Rev. R. H. Graham, of San Salvador, forwarded seeds of Efwatakala to Kew and from the plants raised the structure of the oil containing hairs has been examined and the oil has been analysed. Mr. Dawe also procured a small quantity of seed from Colombia, some of which he took with him to Sierra Leone, the remainder, at the instance of Kew was forwarded through the Secretary of State for the Colonies to Nigeria and Uganda, where it is hoped a sufficient stock of grass will be raised so that a series of experiments as to its efficacy may be carried out."

Dr. O. Stapf, F.R.S. also supplies much information as to the history and distribution of this grass and adds "Bunberry (*Botanical Fragments*, p. 103) has the same tale to tell." The way in which this grass covers the ground (*i.e.* in Minas Geras) continuously for leagues together to the exclusion of everything else, is very extraordinary; "I may add a passage from Van Delden Laerne's "Brazil and Java," page 261. Lands like these (that is, lands exhausted by rank grasses, as *Andropogon bicornis* *Trachypogon plumosus* or by the bracken) then are sown with the capion gordura (Efwatakala) a grass very much relished by cattle which grows so dense and luxuriant that even the stubborn "sake" (*i.e.*, *Andropogon bicornis*) must literally quit the field in this struggle for existence." It is clear from these extracts that in Brazil at any rate, this grass shows extreme aggressive powers on soil which has been disturbed and deprived of its natural vegetation and there is no apparent reason why it should not behave in tropical Africa in the same manner, whenever it gets a chance to do so, although it may be powerless among a vegetation in a state of established equilibrium."

The results of establishing this grass in Nigeria and Uganda should be watched for with much anxiety in the cattle and potential cattle rearing areas of the Gold Coast. In the meantime it is well to bear in mind that the grass has been found growing wild in Lagos and on the Ivory Coast and that possibly it may be found in this Colony. Grasses with hairy sticky, oily leaves should be sent to the nearest Agricultural Officer for identification.

According to a writer in the "Journal of the Jamaica Agricultural Society" for May, 1922, the grass grows readily from seed; throws out horizontal suckers which connect with the ground by a root at every joint; the central root becomes very thick and

powerful and it is difficult to pull it out if the ground even with considerable force. When the grass has become thick it grows to a height of about three feet and forms a close mat which prevents anything from growing under it.

THE IMPORTANCE OF TICKS IN CONNECTION WITH LIVE STOCK INDUSTRIES.

By

S. R. RIPPON, M.R., C.V.S.

Ticks are responsible for considerable yearly losses amongst animals, and the question of their control and eradication is one that owners and breeders of live-stock can no longer afford to overlook in the Gold Coast and Northern Territories.

On the contrary, it is a matter that should receive the greatest attention on the part of all concerned in the live-stock industry. The tick is a parasite of warm-blooded vertebrates, including all domesticated animals, and obtains its nourishment from the blood of its host. Its head is furnished with a special boring and sucking apparatus, with which it cuts its way through the skin of an animal and then proceeds to engorge itself with blood.

Damage brought by ticks :—

1. An animal heavily infested with ticks is subjected to a continual irritation of skin, this perpetual worry preventing the animal from growing and thriving properly.

2. As much as 20 lbs. weight of blood may be removed from an ox per month in a case of bad tick infestation. This is a severe drain upon the animal, resulting in stunting, slow maturation, anaemia and emaciation. Severe tick infestation can result in the death of the host from acute anaemia.

A bullock, badly infested with ticks, has been known to gain nearly 300 lbs. in weight in two months, after it had been completely freed from ticks.

3. Loss of blood results in a diminution in the quantity of milk produced, with consequent loss of sustenance to sucking calves.

4. The actual damage done to the teats and under of milch cows, as the result of tick bites, often results in blind teats and unsound udders, rendering such animals only fit for the butcher.

5. The bite of the tick allows the entry of pus-forming and other bacteria into the wound, often resulting in the formation of small abscesses, and causing a good deal of damage to the hide.

It has been estimated that the damage done to the hide may be as high as 30 per cent.

6. There are organisms present in healthy animals which do not cause disease while the animal remains healthy, but once the natural powers of resistance are weakened from any cause, these organisms become actively pathogenic. An animal, debilitated owing to tick infestation, is likely to become the subject of attack from such ubiquitous organisms.

7. Similarly, diseases caused by organisms foreign to the animal, are more likely to have a fatal termination in a poor-conditioned than in a healthy animal.

8. Lastly, it has been conclusively proved that ticks are the transmitting agents of a number of microbial diseases both in man and in domesticated animals, in the same manner that mosquitoes are the carriers of malaria in man.

Life-History of Ticks:—

The engorged female, when replete with blood, drops off the animal and falls to the ground; she then finds a sheltered spot in which to lay her eggs, usually under a stone, lump of earth, tuft of grass, or in a crack in the ground. After a few days, or a week, she commences to lay her eggs, and this process occupies from a few days to several weeks. The number of eggs laid varies with the species, some species lay several thousands. The eggs are very minute, smaller than a pin's head, and are laid in a coherent mass.

In some cases the spent female shrivels up and dies at once after oviposition is completed, others produce batches of eggs periodically.

In the course of a few weeks, the eggs hatch out and produce larvae, which are very minute and have *three pairs of legs*. They climb to the top of grass leaves and stems, where they congregate in a compact mass, and lie in wait for a suitable host. When the latter brushes past, they get on to its body and become attached, and then engorge with blood.

From this point, two types of ticks are recognised, *viz.* :—

1. Continuous feeders.
2. Interrupted feeders.

In the continuous feeders, the larva takes hold of the animal's skin and fills itself with blood. After a certain time, it becomes quiescent, and undergoes a moult, without letting go of the animal. As a result of moulting, the tick passes from the larva to the nymph stage. These nymphs have *four pairs of legs*, but are not sexually developed. The nymph also engorges itself with blood and when replete undergoes a moult without letting go. As a result of the second moult, males and females are produced and the cycle is completed.

In the interrupted feeders, the larva drops off the animal to the ground for the purpose of moulting. The resulting nymph attaches itself to an animal, engorges, drops to the ground, moults and gives rise to males and females, so that three host animals, may be visited during the course of development.

The males remain comparatively small and do not engorge with blood. The females are fertilised while small, then proceed to engorge.

Temperature plays a great part in the different stages in tick life, warmth accelerating, and cold delaying the time taken in laying the eggs, hatching them out, and in ticks moulting from one stage to another.

Local application of the above.—While on tours of inspection in the Northern Territories, I have been able to give demonstrations of the different stages in the life-history of ticks, to the villagers in most divisions and sections of the north-eastern veterinary section. The people realised that the blood in engorged ticks came from the cattle, but many did not know that much harm was caused thereby, and none knew that ticks could transmit disease. When I asked them how ticks were born, none could tell me, and they were frankly incredulous when I said ticks laid

eggs. On my showing them, in one box, female ticks surrounded by their eggs, and in another box, eggs hatching out into larvae, they were very astonished and highly amused. I tried to impress upon them how dangerous ticks are for their cattle, and told them to begin to make their small boys pick off all ticks regularly, and kill them by burning in a fire, or crushing with stones. The engorged tick is a delicacy with many small boys, eaten fried, but as I pointed out to them, when the tick has become engorged the damage is done.

TICK-TRANSMITTED DISEASES.

The majority of diseases transmitted by ticks are caused by microscopical parasites which live in the red corpuscles of the blood. The invaded corpuscles are ultimately destroyed, and in some cases the corpuscles are decreased as much as one-fifth.

In normal blood, the red corpuscles are constantly broken down and replaced by new ones, the red colouring matter, haemoglobin, thus liberated, being converted by the liver into bile. In these diseases, excessive breaking down of haemoglobin results in overproduction of bile, which cannot be discharged in the ordinary manner, and is re-absorbed into the blood, thus staining the tissue yellow.

The spleen frequently becomes enlarged, and where dissolution of the red blood-corpuscles has taken place rapidly, the urine is frequently red.

A recovered animal, in some cases, acts as a reservoir of the disease, and can transmit it through the agency of ticks to susceptible animals.

Such recovered animals, which still harbour the parasite in their blood, may be subject to relapses, if their system experiences a severe strain or shock, or other lowering influence, such as occurs when the animal contracts another serious or debilitating disease.

Red-water, Texas Fever, or Bovine Piroplasmosis.—This disease is the most common malady affecting bovines in tropical and semi-tropical countries. The casual agent is an intra-corpuscular organism called *Piroplasma bigominum*, transmitted by the Blue Tick (*Rhipicephalus—decoloratus*). The Blue Tick is a continuous

feeder, *i.e.*, it does not become detached to moult, and the larvae of this tick, hatched from eggs laid by females which have matured, either on sick, or "reservoir" animals, communicate the infection to other susceptible cattle on becoming attached. From this, it will be seen that the infection, in the case of Texas Fever, passes through the egg stage of the tick responsible for its dissemination. Both the larva and the adult may live for six months off the host in a condition of enforced starvation.

The disease occurs usually as an enzootic, affecting calves during the first few weeks or months of their existence, and usually runs a very mild course. In many instances, the symptoms are not noticeable in animals of the native breed of cattle, but in the progeny of animals imported from Europe the symptoms are more pronounced.

An animal that has recovered is immune to the disease, but even without re-infection by ticks, the blood of animals that have recovered remains infective for a considerable time.

Symptoms of the disease.—The animal is dull and sluggish, shows a disinclination to move, and stands apart from the rest of the herd; hair is erect, the ears droop, eyes are dull, temperature high, feeding and rumination cease, and the animal falls off rapidly in condition. Later the breathing becomes laboured, and finally the animal lies down or falls down and becomes semi-conscious. The diagnostic symptom is the passage of bloody-coloured urine. In animals recovering from the disease, symptoms of anaemia and jaundice are usually well-marked. Pregnant cattle frequently abort.

East Coast Fever.—This disease has not yet made its appearance in the Gold Coast, but should it be introduced, the transmitting ticks are already here for its propagation. The tick chiefly concerned is the Brown tick (*Rhipicephalus appendiculatus*), but the Red-legged tick (*R. evertsi*) and the Black-pitted tick (*R. sinuatus*) can also transmit it. About 95% of cases of this disease terminate fatally.

Gall-sickness of cattle.—This is a disease similar to "redwater," but blood-tinted urine is never seen. Nervous symptoms are more in evidence, staring eyes, aggressiveness, and trembling. Loss of flesh is very rapid.

Heartwater.—The virus of this disease is carried by the Bor tick (*Amblyomma hebraeum*). It affects goats, sheep, and cattle. Cases resembling "heartwater of sheep" in South Africa, have been seen in the Northern Territories. The disease gets its name from a clear, straw-coloured fluid found in the sac enclosing the heart, on post-mortem examination.

Biliary Fever of Horses.—This is a disease affecting horses, mules, and donkeys, caused by another intra-corporal parasite transmitted by the Red-legged tick (*R. evertsi*). The animal first dull and sleepy, with high temperature and accelerated pulse. The mucous membrane of the eye and mouth is yellowish, the former often having red blotches in it. The urine is highly coloured, there is constipation, loss of condition, and general debility.

Malignant Jaundice of Dogs.—This is another tick-transmitted disease. The responsible tick (*Haemophysalis leachi*) only transmits the disease in the adult stage, but the infection is carried from the egg through the larva and nymph stages, and as the tick is an interrupted feeder, it is easily understood how this disease may be carried for long distances, for both larvae and nymphs may be transported by dogs and other carnivora. The affected animal is very dull and will not feed; nose hot and dry; mucous membranes of the eye and mouth at first congested and yellow tinged, later anaemic and very yellow; urine high-coloured, and breathing quickened.

Spirochaetosis of Fowls.—This is a disease of the fowl transmitted by another species of tick (*Argas persicus*), which shelters in cracks and crevices of fowl houses and in cracks in the bark of trees. It only comes out to feed at night. Adults can live without a host for at least eighteen months. Susceptible fowls, introduced into infested premises, quickly contract the disease, and the mortality is very high. The symptoms may be acute or chronic. In the acute form, there is high fever, great thirst, loss of appetite, ruffling of the feathers, drooping of the wings, greenish yellow diarrhoea, dullness, disinclination to move, the fowl finally falling down and dying in a few hours.

METHODS OF DEALING WITH TICKS.

1. *Hand-picking.*—This is possible where a few animals only are kept, but is impracticable on a large scale. All ticks picked off should be carefully destroyed, by burning or crushing.

The parts of the body favoured by ticks are those which are wet and sparingly clothed with hair, and where the animal cannot readily reach with its mouth; in cattle the udder and teats, butcheon, scrotum, insides of the hind-legs, and the neck.

A disadvantage of hand-picking is that by thus forcibly moving the tick, which is anchored to the skin by an arrangement of hooks, a piece of skin is often torn away with the tick.

2. *Smearing*.—The skin is covered or smeared with preparations obnoxious to ticks *e.g.*, sulphur and oil, petroleum, etc. It is only practicable where few animals have to be dealt with.

3. *Burning the pasture*.—This is a good measure to adopt, but many ticks escape by being concealed in crevices in the soil*.

4. *Hand-spraying*.—The skin may be sprayed with solutions poisonous to ticks, a method which gives excellent results, but it is a slow process, and must be done very thoroughly to be effective. A hand-pump is required with ten feet of rubber hose carrying a "Vermorel" or "Cooper" nozzle. The solution can be pumped from a bucket. Hold the nozzle about one foot from the animal, start near the head and work round to the other side, saturating all parts.

5. *Dipping*.—By this method large numbers of cattle can be dealt with in a very short time. The only dips of any practical use for the destruction of ticks are those containing arsenic in solution.

Concrete baths are erected and these vary in pattern, but the entrance or take-off should have a slope of about 45%, the exit slope being at an easier angle. The sides are sloped from a width of about 2 feet 6 inches at the bottom, to 4 feet 6 inches at the top, and the total length of the bath may be anything from 30 to 70 feet long. This bath is filled with the dip, and a continual stream of cattle can be admitted from a "crush pen" through an entrance race into the bath and out at the exit into a draining pen.

*We look forward with interest to the time when the Veterinary Department have at least one pasture composed entirely of Efwatakala grass, which in East Africa and Colombia is not only considered an excellent green fodder, but has the further valuable property of being distasteful to ticks. It has recently been brought into much prominence as being likely to enable cattle to be kept in the parts of East Africa where this is not at present a sound commercial undertaking owing to the prevalence of ticks. For details of Efwatakala grass see p. . Ed.

The dip is absorbed by the skin of the animal, and the tick sucks in the poison with the blood while feeding. Animals should not be dipped when tired, heated or thirsty, therefore they should be rested and watered before dipping. Rainy days should be avoided, and also "muggy" days. A bright sunny day is the most suitable.

The question of how often to dip or spray depends upon the life-history of the species of tick or ticks with which the pasture are infested. Thus in the case of Redwater ticks, fortnightly dippings would be sufficient, but in the case of the Brown ticks which require three hosts to complete their life cycle, spending very few days on the host at each stage, an interval of only three days would have to be adopted, only in this case one has to be certain that the solution used will not have an injurious effect on the cattle owing to these frequently repeated dippings.

6. *Treatment of Fowls*.—When fowl houses become infested with ticks, they should be either burned, pulled down, and re-erected, or else thoroughly sprayed with a solution that will destroy the ticks, *e.g.*, kerosene, 25%; water 75%. It must be forced into all cracks and crevices by means of a strong sprayer pump. Trees and posts near by should be examined carefully to see if they are harbouring the ticks in cracks, or in or under the bark. It is a good plan to have the fowl house whitewashed after it has been disinfected.

Dipping may be practised to destroy the larval ticks. A suitable solution is Jey's fluid, 10%, water 90%.

How to keep Poultry.

BY MRS. BETTINGTON.

Now I suppose you have built your Fowl House and are wondering what fowls to put in it. *How to Start.*—There are many ways of starting; one of the best ways is to get an English Cock, either from England or one that has been hatched in West Africa from pure bred English Fowls; then go round and buy eight or ten of the best Native hens you can get and thus start your chicken farm. When the hens are laying and have laid for about ten days, begin and keep your largest and best looking eggs for sitting. Put the eggs to hatch under your quietest hen that wants to set. The pullets from these eggs you keep, must be mated back to your cock. Don't keep the cockerels, kill them off as soon as they are old enough; they are no use to breed from.

Improving the results.—The result of mating your first cock with the first pullets will be that their chickens are $\frac{3}{4}$ English blood; some will grow almost as large as an English Fowl, and most of them will lay large eggs, perhaps not their first eggs, but their second lot after their first resting period. *Start and pick out your best laying hens* and get rid of those that are not good layers; remember *every hen ought to lay 200 eggs every year* and some hens will lay 300 eggs a year. You can also begin now, and pick out one or two good cockerels, which, no doubt, some of your friends will be glad to buy for breeding from. Try and get a pure English cock for your own use, you will find it is the best way, though later on I will tell you how to build up two separate lines, and to mate them back, so that you need not go outside your own farm for a male or female fowl.

Starting from English fowls.—There are, of course, other ways of starting your Poultry Farm, you can buy a sitting of eggs from English Fowls. This is a much cheaper way, but not so quick; then another way is you could buy all English male and females. This is expensive, though very much quicker, but your fowls are not so hardy and some may die "for nothing" as you say.

Kinds of fowls to keep.—Now you want to know what breed to keep; first of all the question is (1) do you want fowls for laying, or (2) for big eating birds or (3) a mixture of laying and eating. If you want laying birds, you must get a light weight breed such as Leghorn, Anconas or Minorcas; these are not large birds but they are larger than the Native, and *they all lay large eggs*. The Leghorn is a very good bird to start with, and you could get a heavier breed for your second year cock.

If you want large birds for eating you must get a heavier breed such as Dorking, Sussex, Game or Orpington. These are all heavy birds, but I have found them too heavy for this country, and after a short time they lay very few eggs.

For an all round bird, Wyandottes, Rhode Island Reds and Plymouth Rocks are hard to beat. I like the Wyandottes best, but they are all good, and crossed with a Leghorn cock make very good layers and eating birds.

Attention is necessary.—But whatever fowls you keep, you must look after them from the very first; it is no use hatching out a lot of chickens and then leaving them to look after themselves with a handful of rice thrown down when you remember them. If you want them to grow and do well, you must feed them

well. For the first week after they are hatched, you must feed them every two hours during the day : after that, four or five times a day. They only want a little at a time, not more than they can eat up ; don't throw a great heap down and expect them to live on that all day. The food only gets dirty and sour ; it then does the chickens no good and they very easily get sick.

(The first article of this series is to be found on pp. 45-46. Ed.)

M.B.

HEALTH WEEK AIMS AND OBJECTS OF, AND HOW TO ORGANISE.

By P. S. SELWYN-CLARKE, M.D., D.P.H., ETC., M.O.H., Accra.

Health is the true wealth of old and young, of rich and poor, and of chief and labourer.

A country cannot be made healthy by ordinances, although laws and regulations, lectures and teaching in schools, assist in bringing this about.

Intelligent co-operation on the part of the people of a country is a matter of very great importance, and "Health Week" is one of the means by which this can be brought about.

It has been clearly realised that a sense of personal responsibility for health is an essential to all progress in the campaign against disease, and that without the appreciation of this, much loss of energy, and wasted expenditure, must inevitably result, since the Health Authorities do not always receive the assistance to which they are entitled in their efforts to improve health conditions.

In order that the general public may realise the necessity for loyal co-operation with the Health Authorities, it is desirable that they should have some idea of the cause of diseases and of the means of combating the same. Public opinion, moreover, should be educated to be intolerant of the existence of a high sickness or death rate in any particular area.

"Health Week" is a valuable help in this matter, as being a specified period in each year, during which public attention can be directed to matters relating to the health of the community. It should be fully understood that many of the activities carried out during a health week could be equally well carried out throughout the year, and that health weeks are merely periods of intensive activity, devised so as to provide the necessary stimulus to a community to take on with fresh vigour the struggle against preventable diseases.

THE OBJECTS OF HEALTH WEEK ARE SUMMARISED AS FOLLOWS :—

- I. To direct public attention for one week in the year to matters of health
- II. To make every single individual realise that it is his duty to give every assistance to the Government and Health Authorities to improve health conditions, and that without his loyal co-operation much of the energy and money expended by the Government and Health Authorities must be wasted.
- III. To make everyone intolerant of the large amount of sickness that prevails, and of the number of deaths that occur, especially among small babies.
- IV. To make everyone realise that disease is a thing that can, and should be prevented.
- V. To indicate ways in which sickness can be prevented.

THE ORGANISATION OF HEALTH WEEK must depend to some extent on local conditions and on the resources at the disposal of organisers.

The following suggestions should receive careful attention from all members of the community :—

1. Houses, yards and surrounding areas should be kept clean, free from high grass and weeds, from stagnant water, and from dirt and rubbish of all kinds.
2. Household refuse should be placed early every morning inside public dustbins, or in places set aside for the purpose, and should not be deposited in drains, streets, lanes or open spaces.
3. On premises where properly supervised private latrines do not exist, the public latrines should be used. Persons found relieving nature in streets, lanes, open spaces, etc., should be severely dealt with, as being a source of grave danger to the community.
4. Pure water only should be drunk. Water pots and containers should be cleansed out daily, and no stagnant water should be allowed to remain on, or near premises, so as to prevent the breeding of mosquitoes.
5. Pure food should be eaten, and if kept, it should be stored in a clean, dry, cool place, protected from flies, rats and mice, ants and cockroaches.
6. Pure air should be inhaled. Hygienic dwellings, built with the sanction of the authorities, should be constructed, and the windows of the same should be kept open day and night. Persons should not sleep with their heads covered by cloths, blankets or sacking. *Spitting should be rigorously forbidden.*
7. The body, including the teeth, should be cleansed at least once daily. Only clean cloths and clothes should be worn.
Bedding should be aired daily.
8. A campaign should be directed against Flies, Mosquitoes, Rats, Mice, Fleas, Cockroaches and Bed Bugs—all of which convey diseases.
9. Every person should protect himself, and his family, from Small-pox by submitting to vaccination.
10. All cases of infectious or contagious diseases, *e.g.*, Small-pox, Plague or Yellow Fever, should be reported to the Health Authorities, to the nearest Doctor, or to the nearest District Commissioner.
11. The advice of qualified doctors should be sought in all cases of sickness.
12. Experienced midwives should be engaged to attend the births of all children. All births and deaths should be reported to the Health Authorities, or other Government Officers in stations where there are no doctors.

The points mentioned above should form a sufficient basis upon which the organisation of Health Week could be built.

WHEN ORGANISING A HEALTH WEEK the willing co-operation of all members of the community should be sought, including medical and sanitary officers, political officers, chiefs and headmen, schoolmasters and teachers. In a series of meetings between the organisers and those whose assistance is required the aims and objects of health weeks—with special reference to the conditions existing in the particular locality—and the means by which success can be achieved, should be made clear.

In their turn the chiefs can beat gong-gong and spread the gospel amongst their subjects, and in the same way, teachers should explain matters to the school-children under their charge. This step should be taken a short time before the date decided upon for the commencement of the week. In addition, preparations for lectures and demonstrations to the general public and for special hygiene lessons to schoolchildren should be completed.

It is useful if the town or area concerned can be divided up, and a chief or headman or a school or class of children made responsible for the cleaning up of one or more of such divisions.

This causes a feeling of rivalry between two sections—each section trying to do its particular work better than the other. The date which should coincide if possible with that of health weeks elsewhere—having arrived, well-disciplined gangs of voluntary helpers, or schoolchildren under responsible leaders, should visit different portions of the town or village, being supplied with, if possible, trucks, shovels, forks, rakes, and cutlasses.

THE WORK OF SUCH GANGS will consist of persuading house owners to deliver up all their useless rubbish, tins, bottles, old sacking, etc., accumulated previously, and assistance will be given to such persons to pack their refuse into trucks, or, if these are not available, into the baskets or receptacles carried by volunteer helpers.

Lanes, streets and open spaces will be cleared of cactus, grass, weeds, and any accumulation of refuse, and this will be burnt, or deposited on the rubbish places set aside for the use of the town or village.

USEFUL WORK CAN BE DONE BY GIVING ADVICE during these house-to-house visits by school-children and persons who have learnt, in lessons or lectures, the value of preventive methods against disease.

During the period of Health Week, lectures and demonstrations on health subjects, and displays by boy-scouts, lads' brigades, and other similar organisations can be given, so as to direct public attention, as much as possible, on the subject of preserving health and preventing disease. Some areas may be fortunate enough to possess persons with artistic skill, who can draw up posters, showing in a graphic way the dangers resulting from uncleanness, from eating impure food, from drinking impure water, from breathing foul air, or from allowing the presence of flies, mosquitoes, rats, fleas and bugs on premises.

The writing of simple essays by school-children on the ways and means in which they can help in the fight against disease, and in the campaign for the preservation of good health, helps to impress on the rising generation the need for such action.

Finally, it must be fully appreciated that the work done during a health week should not cease at the end of the week, but should be vigorously carried on throughout the year.

It is only by such means that the public conscience can be roused, and health—which is wealth and happiness—brought to a community.

THE COLOUR OF CITRUS FRUIT.

By H. C. HENRICKSEN, Experiment Station, Porto Rico.

The green colour of citrus fruit is, in the mind of the public, associated, more or less firmly, with a state of immaturity. The two conditions are not necessarily associated, but the belief that they are militates against the sale of green coloured fruit. The green colour is the natural one as long as the fruit is in the development stage, it usually changes from green to yellow or orange as the fruit reaches full maturity, but it does not always do so in the tropics as illustrated by the "King" orange. Grapefruit may also remain green on the trees, where the conditions for vegetative growth are uniform throughout the time that the fruit naturally reaches maturity.

Chlorophyll in the plant ;—

The green colour of plants is due to a substance called chlorophyll. It is through this substance that inorganic matter is changed into the organic matter of which the plant tissues are built up. Under normal conditions of growth chlorophyll is being formed constantly, but it is also being changed by the action of light. When the sapflow stops, chlorophyll formation also stops, but that which was previously formed continues to change through the action of light. One of the results of this is that the colour of the parts containing chlorophyll changes from green to yellow, orange, red etc., according to the species of plant. This change takes place regularly in the temperate zone because of a drop in temperature ; the visible result being the autumn colouring of foliage. In the tropics, the chlorophyll in growing vegetation also changes when the sapflow is checked or interrupted as, for instance, when a plant becomes diseased, or when the soil in which it is growing becomes too dry, but such are not usually of practical importance for the purpose of colouring fruit while it hangs on the tree. Yet a bright colour is economically important, provided the fruit is mature, while in the case of immature fruit, a bright colour is a detriment. Shipments of bright coloured, immature fruit may sell well, but the shipment of such fruit usually renders subsequent shipments of mature fruit unsaleable.

Chlorophyll in citrus fruits ;—

The green colouring matter in citrus fruit is located in the epidermis, in the tissue immediately beneath, between, and in the oil glands. The amount in the epidermis is small, but is of some importance in relation to the colour of the fruit. Most grapefruit in Porto Rico has minute spots on the surface which are the result of punctures produced by insects. These occur in the breathing pores of the epidermis and usually every pore in a given space is punctured. The visible result of the punctures is that the chlorophyll is changed from green to dark brown or black which causes a streaked or blotched appearance of the rind. But regardless of the exact appearance, such spots cannot be made bright by either natural, or artificial, means. The tissue immediately beneath the epidermis, called mesophyll, contains much green colouring matter, which may change to yellow or orange as the fruit matures, if it is not injured. The punctures just mentioned delay the change, and those produced by purple scale (a minute sucking insect. *Ed.*) frequently arrests it entirely. Also such surface injury as that produced by scab may prevent the colour change from taking place. The chlorophyll in the oil glands is rather more persistent than that mentioned above. It frequently does not change entirely, even if the fruit is fully mature, except in spots that are covered up so as to exclude the light while the fruit hangs on the tree.

Artificial colouring ;—

As bright light changes the chlorophyll, it would seem possible to colour fruit by exposing it to the sun after it is picked. Theoretically it is possible, but it is not practical, except when the fruit is fairly well coloured at the time of picking, also it is impractical with large amounts of fruit. In subdued light, the colour change is very slow, but fruit that is nearly coloured when picked may colour up entirely when left for some time. Colouring proceeds somewhat faster at a temperature of 90 F. to 100 F. than it does at 80 F. or below, but it is well known that to colour by heat is not practical. The method used at present for colouring fruit is to expose it for some time to the gases produced by the combustion of gasoline or kerosene without raising the temperature, that is at a temperature of 76 F. to 86 F. This has not, so far, been very satisfactory, because of an insufficient knowledge of the process. The chief difficulties encountered are :—(1) The rind of the fruit is frequently spotted by the action of the gas. (2) The stems loosen on a large per cent of the fruit, resulting in *Diplodia* decay. (3) The colour produced is seldom uniform in any lot of fruit. (4) The results, when satisfactory, cannot be reproduced with certainty.

The action of gases upon the fruit ;—

In laboratory tests, where all the essential factors were controllable, the results show that practically all gases may produce spotting of the rind provided they strike the fruit with some force. Also a chemically active gas, such as chlorine or sulphur dioxide, may produce spots on the rind when allowed to settle on the fruit. Even as small an amount as 1 per cent in the atmosphere of these gases may cause spotting, when the air is not agitated, while a much larger amount does not cause it, when the air is in motion. This indicates that spotting caused by gases can be eliminated by placing the gas inlet-tube in such position that the gas cannot directly strike the fruit, and by agitating the air in the colouring room, by means of a fan, or by such other means as may be most practical under the circumstances.

The loosening of the stems may take place when the fruit is exposed for a long enough time to any gas, except oxygen. The "popping of the stems," as it is usually termed, is not, however, caused by the gas itself, but rather by an insufficient amount of oxygen mixed with the gases. It can be prevented by forcing fresh air into the colouring room, in such quantity as to keep the oxygen supply at about 15 per cent of the atmosphere, and by keeping the air in motion.

The reasons for the uneven colouring of the fruit are : the uneven distribution of the gases, the different amounts used, the different composition of it, and the difference in the fruit itself. The factor of uneven distribution can readily be remedied by a proper placement of the exhaust tube, and by a fan, if necessary.

The amount of gas necessary is much greater than most people think it is, to merely fill the room full of smoke and then stop is by no means satisfactory. The percentage of acrid gases in the exhaust from an engine, for instance, is but very small, therefore it must be run for hours, not merely a few minutes. The composition of the gases from an engine does not vary much, provided the fuel and the carburetor are not changed, but the gases from a stove are very variable. The old style burners, that were disliked because they smoked and smelled, produce better results in fruit colouring work than the improved burners that produce a complete combustion.

The difference in the fruit in relation to colouring is largely that of the amount of chlorophyll present, although the stage of maturity is important, within certain limits. While a fruit may be green, although it is mature, or yellow, when it is immature, it is nevertheless difficult to colour a very green, and very immature fruit by artificial means. The structure of the rind is also of importance ; smooth fruit, with shallow oil glands, colour much more readily than fruit with a rough rind and deep oil glands. This is due to the fact that the chlorophyll in the oil glands does not change so readily as that in the mesophyll.

Gases as colouring agents :—

The effect of a gas upon the chlorophyll may be directly chemical, that is it may act as a bleaching agent. The bleaching produced by sulphur dioxide is a typical example. But the effect produced by the combustion products of oil is not of that kind. The exhaust from an engine consists of a large amount of nitrogen, usually some oxygen, always a per cent of carbon dioxide, and, when the combustion is very incomplete, there may be present a little carbon monoxide, hydrogen and hydrocarbons. Also some acrid gases are present, the amount of which depends upon the completeness of the combustion. The latter gases are the ones which principally cause the change in colour of the chlorophyll. None of the first mentioned gases produce much colour change when used singly or in combination, although the olefines of the hydrocarbons are of some importance. In testing many different gases, and methods of applying them, it was found that some are inactive, others produce spots on the rind of the fruit, and a great many impart an odour or taste to the pulp. Among the latter may be mentioned ether, chloroform, ethylene; in fact, all gases that are strongly odoriferous. Some of the gases of that character may disappear from the fruit, while others are persistent. For instance, the odour and taste of ethylene or camphor will disappear when the fruit is placed in front of a fan for some time, but that of creosote, tar, kerosene and many other products remain in the pulp.

When exposed for 24 to 48 hours to any gas, or mixture of gases, in which there is little or no oxygen, citrus fruit develops an unpleasant odour and taste. Therefore the method of filling a room full of gas and closing it up, cannot be used even if the colour could be produced in that manner; which it can not, however, because respiration is arrested and the colour change is brought about partly by respiration. Fruit may be exposed to any pure gas for several days without the colour changing perceptibly, but such change will take place after the fruit is exposed to the air, provided the gas employed has had any effect upon the chlorophyll. That is the reason for the present practice of closing the colouring room full of gases for some time and opening it at intervals to replace the gases with fresh air. Lest it should be understood, however, that the change in colour is produced by a temporary interruption of respiration, it may be well to mention that ether, which does arrest respiration, does not produce much colour.

Practical Considerations ;—

To produce the desired results, at all times it is necessary to be able to control all the conditions, in connection with the operation, to a much greater extent than is possible with present methods. The results of this investigation suggest that an even distribution of the gases throughout the colouring room will eliminate some of the present uncertainty. This can probably best be accomplished by placing a fan outside the room, connected with it by inlet and outlet tubes. In that manner the room may be closed up and the air may be rotated instead of being renewed as it is with the present method. Also some of the uncertainty may be eliminated by having an ample supply of gas, containing a higher per cent of acrid gases than what is found in the exhaust products of gas engines. To that end the heavier oil products such as tar and pitch should be given a thorough trial. But regardless of the product employed, it should be possible to connect the gas chamber with the fan intake, in such manner that the proper mixture of gas and air may be forced into the colouring room. The mixture should, as shown by this investigation, contain enough oxygen to provide for the unhindered respiration of the fruit, and also enough acrid gases, of the kind that attacks the chlorophyll, to produce the desired colour change.

In connection with the colouring of fruit the question of maturity must be considered. It is unlawful to offer for sale grape-fruit, that has been artificially coloured, the juice of which contains more than one part acid to seven parts total solids. In the case of oranges the ratio is one to eight. *The Porto Rico Agricultural Extension Notes. November 15th, 1922.*

PROSPECTS IN THE FIBRE MARKET.

Manila Hemp.—The year under review may be considered as one of healthy activity, with a 40 per cent increase of consumption in Britain, and 140 per cent increase in the United States. Japan has been an important factor, having absorbed 200,000 bales, of which four-fifths was used for rope making and one-fifth for paper making. America and Japan bought practically the whole supply of fine grades, leaving little for export to Europe. Our manufacturers had therefore little opportunity of competing for this class of material.

The Philippine Government have been taking active steps to stamp out the inferior grading of Manila, which had resulted in heavy allowances, and the quality has steadily improved, so that weak hemp is as rare now as it was common last year. Last June the Agricultural Department in Manila rescinded the order which prohibited the grading of material below "J". Far from resulting in a reduction of prices, the lower grades "K," "L" and "M" have risen since that date. The Department has been urging manufacturers to pay higher prices for better grades of Manila, on the plea that the prices now ruling do not correspond to the actual increase in the cost of preparation of these grades. To a great extent their wishes have been fulfilled, as "C", "D" and "E" have risen 85 per cent in contrast with 35 per cent increase in the lower grades.

Sisal.—1922 has been a year of great activity in Sisal, and the increased shipments from East Africa have gone into consumption as fast as they came forward. The stability of the price of this article assisted by the action of the *Comision Exportadora* in fixing the price of Henequen, has had a salutary effect on the trade. The steady reduction in freights from the beginning of the year until the autumn made it possible to accept orders for large quantities of African Sisal for America on fairly satisfactory terms, but the price has been undeniably too low to be remunerative to a large number of plantations, especially in districts far removed from the Coast, and heavy losses have been registered by several companies. Nevertheless the cultivation of Sisal on the East Coast of Africa is extending and this popular fibre is likely to continue to meet a healthy demand during the coming year.

Mexican (Henequen) Sisal.—The very unsatisfactory situation of this article alluded to in our last Annual Circular has fortunately entirely changed, and the stabilisation of the price, which was accomplished at the end of last year, has been maintained with results which should prove satisfactory both to producers and consumers, including the farmers who depend upon a supply of binder twine at reasonable rates. Growers in Mexico complain that after the deduction of the production tax of 3 cents per lb., little remains for the maintenance of their estates, but there is no accumulation of stocks beyond the balance of the old material which will shortly disappear. Owing to the reasonable price of the article, a considerable quantity of Henequen has been imported to Europe, and reports indicate that a great improvement has been effected in quality, enabling manufacturers to extend its use. In December the price was advanced quarter of a cent per lb

New Zealand Hemp.—Interest in this fibre has continued to flag, and it appears to have lost the ground which has been gained by Sisal. The high wages in New Zealand, and the more remunerative employment in other industries tell against the production of that fibre, so that there has been a considerable curtailment in the output, and the consumption is more and more confined to New Zealand and Australia. Lower freights might help to restore the export trade.

Maguey Fibre.—Although the Philippine Government have been making an effort to alter the system of production of this fibre, there is no visible improvement. Attempts to prepare the fibre in an up-to-date way with decorticators, and to grade the "Sisal" separately from Cantala, have not proved a success owing to the mixture of the plants in the field, and the difficulty of separating the leaves in the cutting and preparation. The trade in Maguey, however, continues on about previous lines, and the price has varied little throughout the year.

Fibre Values in the United Kingdom.

	July 1914.	Jan. 1st 1919.	Jan. 1st 1920.	Jan. 1st 1921.	Jan. 1st 1922.	Jan. 1st 1923.
	£ s.	£ s.	£ s.	£ s.	£ s.	£ s.
Manila J. per ton ..	25 0	80 0	60 10	56 0	38 10	33 10
New Zealand Fair per ton	23 0	85 0	48 0	50 0	35 10	31 0
African Sisal No. 1 per ton	26 0	58 0	58 0	53 0	39 0	35 10
Cotton spot Liver- pool per lb. ..	6.68d.	22.00d.	30.50d.	9.90d.	12.00d.	15.40d.

(Extract from "Annual Review" of Wigglesworth & Co., London, January 12th 1923.)

Note.—*Manila Hemp* is obtained from a plantain-like plant known as *Musa textilis*. The plant could be grown throughout the cocoa area. It does not produce food. Each "stem" is said to yield from one to five pounds of fibre and the annual yield per acre to be from 3 cwts. to one ton. The fibre should be from six to 10 feet long. It appears not to have received attention as yet in West Africa, though an effort is now being made to establish it on derelict cocoa farms in Fernando Po. We might usefully make trials with it as wide hedges round cocoa farms providing the fibre could be extracted at suitable centres.—Ed.

PROVINCIAL REPORTS.

The following information has been supplied by the Director of Agriculture from reports made by Provincial Superintendents for the quarter ending December 31st :—

EASTERN PROVINCE.

By Mr. C. H. KNOWLES, B.Sc., Provincial Superintendent.

The Provincial Superintendent was absent from his Headquarters travelling for 33 days during the quarter.

2. The districts visited were Eastern Akim-Kibbi, Apedwa-Nsawam, Asamangkese, and at the end of December he commenced a visit to Togoland, Quittah, Addah-Accra Coast area. Although the last trek was not completed in the quarter, it will be convenient to report it here to avoid spreading one trek into two reports.

3. **Kibbi-Nsawam.**—During the Kibbi-Nsawam tour the attention of every one was called to the approaching Agricultural show, but it appeared, for reasons which do not need further reference here, that there was not likely to be much response from this district.

4. The Junior Trade School was visited and the arrangements already made for the assistance in agricultural instructions from the Assistant Superintendent were discussed with the Acting Headmaster and found to be satisfactory.

5. At Suhien and Asuboi, meetings were held to discuss the question of withholding cocoa from sale. It seems that no decision had been come to by the Association on the matter, but later in the year there was not only some holding up of cocoa, but some interference with persons who did wish to sell, carry or buy cocoa. Some members of this Association are firmly convinced that if the Association comes to a decision on such a matter, it is within the power of the Association to force farmers and others not members of the Association to agree. I am in entire sympathy with this Association in its desire to improve the position of the farmer, and its rules are drawn up with the object of improving the farmer's methods and quality of his produce.

6. It is rather a pity that what could be a most useful body like this should make the serious mistake of encouraging its officers and members to break the law. I have met the President of the Association once or twice and discussed these matters with him and also pointed out that every bag of cocoa withheld from the market strengthens the position of countries which will certainly become somewhat serious competitors of the Gold Coast in the production of the lower grades of cocoa.

7. **Conference at Accra.**—During the month of October the Provincial Superintendent attended a conference in Accra of Provincial Superintendents of Agriculture who met His Excellency for discussion as to arriving at some uniform and practical method of estimating the possible production of cocoa based on the population. Maps have been prepared showing areas now devoted to, and the possible extension of cocoa, kola and oil palm products.

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9. **Peki.**—The December trip was first to Peki where a thorough inspection of the Agricultural station was made, the last one having been in May, 1922. Certain members of the local Cocoa Growers' Association were interviewed.

10. **Cocoa Buyers from French Togoland.**—Buyers from Palime (French Togoland) are now buying cocoa in Tsito and Peki and the price has been 14s. at the former and 13s. at the latter, 1s. being paid for head loading over the hill between the two. In Tsito the cocoa is carried by lorries to Palime, a distance of nearly 60 miles. It appears a large reduction in railway freight from Palime to Lome has been responsible for this increase in price; one year ago the price paid for cocoa at Peki was 8s. 6d. a load of 60 lbs. And yet the members of the Association referred to complained of the price paid them. In Palime buyers are taking cocoa from Kpandu, Ho and other centres in Togoland.

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12. **Ho Agricultural Show.**—The Provincial Superintendent then went to Ho for the Agricultural Show which was held on January 6th. The show was opened by the Honourable Commissioner, Eastern Province, after which Mr. Bunting, Assistant Director of Agriculture for Research, gave a short address. The Provincial Superintendent gave some assistance in arranging the exhibits and acted as a judge with Mr. Bunting, Mr. Mensah, Overseer, and two Chiefs in the Economic Products and Foodstuffs sections.

13. The exhibit of Agricultural Department was well displayed by Mr. Mensah, who gave four lectures to visitors, chiefly on the subjects of the posters, which were extremely well attended. The show was quite successful. It proved to be a very much larger affair than the organisers had anticipated and most certainly gave additional proof of the value of these shows. The cocoa exhibits were, in general, not sufficiently fermented, but the winning exhibits were of quite good cocoa. Of the numerous entries of cocoa pods, only two lots could be found free from attacks of pests and diseases. The cotton, corn and foodstuff exhibits were numerous and the quality very good.

14. Some enormous roots of Cassava were displayed. Whether the production of such huge affairs is to be preferred to that of the more modest roots is perhaps doubtful because of the larger proportion of fibrous matter and possibly because of the lower starch content, but certainly the exhibits were prize specimens. The Show was well attended.

15. **Ho-Keta.**—From Ho to Keta, I travelled down the Ho-Addome road turning east at mile post 20 and following the old Anglo-German boundary through Avege (Old Preventive Station) across the Tadsí River, and in Kpeve (Old Preventive Station) to Zope Preventive Station. All this was over a track bounded by high grass, though at one time a road. At Zope an excellent road runs to Aferingbe and on through Dsoje, Denu to Kete. The land is chiefly grassy plains. At Avege, excellent coconut palms were seen, loaded with fruit and the advantages of this plant were pointed out. The chief said his people had begun to plant and I advised the extension of the industry. Indeed, I think a good deal of this land in coconut would provide a large industry, and as the coconut palm entails little work, it should be no great tax on the energies of the population.

16. **Keta-Addah.**—This district is the chief copra-producing area of the Province. The palms were bearing very heavy crops at the time of the visit. And indeed with palms bearing as they do, one may be inclined to marvel why there should be an acre of suitable land not planted up. Some planting has been going on, as several patches of young palms were observed which had not previously been noticed.

17. Another feature which strikes one as curious after carefully considering the number of coconut palms is the relatively small amount of copra exported. One cannot think that any nuts are allowed to waste, so it follows that relatively large numbers are consumed locally or sent inland. Several firms were buying copra, but all complained that the trade was not brisk. The prices ranged from £15-£17 per ton. Careful attention was paid to the quality of the copra in various stores and it is to be regretted that little improvement, if any can be reported. The proportion of copra made from mature nuts reported in the January-March quarterly remains much as before.

18. While the reason for this must certainly be set down to the method of reaping employed, namely cutting the nuts green after climbing the tree, the fault referred to need not necessarily exist. There are two factors which unite to bring about the result.

- (a) the disinclination on the part of the farmer to climb the trees more often than he considers necessary, resulting in immature nuts being cut at each visit to the top of the tree,
- (b) the ease with which money can be procured almost at any time by climbing the palms and cutting down sufficient nuts and turning them into copra without consideration as to their condition.

If the method of reaping was to collect the nuts after they have fallen naturally on reaching maturity, both of these factors would practically cease to come into play. The Fia was interviewed in reference to an oil mill but further discussion resulted in advising the Fia to get his people to realise the advantage of planting more coconut palms rather than to bother about a mill.

19. At Addah a large area of land between the sea and Government buildings and around the latter might with advantage be put under coconuts, which could be done comparatively cheaply as the clearing necessary has practically been done by the Sanitary gang.

20. **Addah-Prampram.**—From Addah I proceeded inland through Tamatoku where I turned Amlekpoe and Sege and a number of smaller villages. These are scattered over the grassy plains and the track is swampy in wet weather. It is very sandy in places. I doubt whether the cultivation on a large scale of any crop except those now cultivated for food is to be recommended, but in the less swampy areas, I am suggesting to the District Commissioner the advisability of getting the people to try small patches of ground-nuts. The fires which sweep over these plains are against the planting of permanent plants unless the farmers are prepared to extend their precautions against fires.

21. Between Sege and the coast numerous herds of cattle were passed and although the grass they were eating was dry and coarse, they appear to be thriving. One Hausa, I met further west along the coast had half dozen bottles of milk, he was taking for sale.

The inland road reaches the coast and joins a coast road about two miles west of Lekponu. In dry weather this is a good road for cycling. When approaching the coast one can pick out each village by the cluster of coconut palms round it, but they have been planted only for local requirements. The whole strip between the lagoon or swampy continuation of it and the sea is fit for coconuts as well as the land around the sea side of all the ridges separating lagoon from lagoon.

22. The Communal Coconut Plantations being formed at Kpone-Prampram, Tema, Teshi and Labadi were inspected and necessary instructions given.

26. **Koforidua Show.**—An Agricultural Show under the auspices of the Gold Coast Agricultural and Commercial Society was held at Koforidua, on December 5th. In the unavoidable absence of His Excellency the Governor and of the Honourable Commissioner, Eastern Province, the Show was opened by Mr. G. R. Manners, District Commissioner, Akuse, and the Director of Agriculture.

A special report has been submitted on the show.

27. Reports are attached from Mr. Glover, African Assistant Superintendent of Agriculture, on his itinerant at work and on the Station under his charge, and from the Officers in charge of Aburi and Peki on their Stations. These need little comment from me. (Not submitted for publication.—*Ed.*)

29. Mr. Vardy proceeded on leave on October 28. During the month he was employed in inspecting cocoa farms in Akuapim and New Juaben.

30. **Asamangkese.**—During the quarter, clearing for the 2nd block of five acres has proceeded, at first under contract with Hausas from Asukoko, who, however, failed to complete the work, which was then continued by hired labour.

The work was not quite so heavy as in the case of the first block. A new nursery was established with pods from the selected trees at Aburi and the young plants are doing well.

Block I.—The weeds in this block were cut down and spread over the soil as a mulch. The young plants are doing fairly well. "Sankonuabe" attacks were observed and dealt with during each month.

31. **Pompomsu School.**—It was hoped that a start could be made at this school which the farmers in the neighbourhood are establishing for the purpose of having their sons instructed in agriculture. Mr. Nkpe, Junior Assistant Overseer, who was selected as instructor and whose services have been offered free of cost to the organisers, went there in December. As the building for the school had not reached a sufficiently advanced stage, the opening had to be postponed.

32. Mr. Eady, Assistant Superintendent, returned from leave in November and proceeded to his district. Before, however, he could commence his itinerant duties he had to return to Accra to go into Hospital. He resumed duty early in January.

CENTRAL PROVINCE.

By Mr. A. B. CULHAM (Acting Provincial Superintendent).

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2. Staff Movements.—Mr. J. Steel Assistant Superintendent resumed duty at Assuantsi on the 8th November, relieving Mr. G. H. Amoo, travelling Instructor, who proceeded on leave on the 1st December. Mr. G. A. Saforo, 3rd Class Clerk returned from leave on the 15th December. Coconut Craftsmen Appoo and de Silva sailed from Seccondee on the 12th November, permanently invalided. Western Akim and Upper Saltpond is still closed owing to insufficient staff

3. The Acting Provincial Superintendent travelled 42 days in the quarter, being engaged on itinerant work in Western Akim and in connection with the Cocoa Farm Competition in the Cape Coast district. The District Officers of Cape Coast and Winnebah travelled 37 and 59 days respectively. The major portion of the latter was done in the Cape Coast district where the Officer was temporarily engaged for the purpose of the Cocoa Farm Competition.

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4. Weather.—The late rains have been excellent, and have to some extent recovered the agricultural position so far as permanent crops are concerned. October was unusually wet, 12.03 inches being recorded at Nsuaem (Oda), and 14.94 inches at Hemang Sub-Station. The only place recording an absolutely dry month during the quarter was Saltpond, in November.

5. Cocoa.—The late rains, whilst causing the trees to put forth new leaves and generally improve the appearance of most farms, have not been an unmixed blessing, as farmers delayed the picking of their cocoa even more than usual, with the result that much cocoa became over-ripe, and such as was picked frequently sold in a damp and externally mouldy condition. Where growers have stored the produce, in the hope of a better price, the effect has been heightened. Some farms, especially near the coast, have been slow in recovery and will require a continuance of favourable conditions to assume their earlier aspect.

6. Buying has been fairly brisk, but shewed a tendency to sag towards the end of the quarter, when the price fell from 16s. to 14s. at Port. A slight recovery has since occurred and the price is now 14s. 9d. Prices on the home market have, of course, largely influenced this, though the reduction of duty no doubt enabled fortunately situated buyers to pay somewhat over the actual market price early in the season

The supply, whilst up to the present keeping pace with demand, is, according to information received, below normal, the crops having suffered from the protracted drought.

The Assistant Superintendent, Cape Coast, reports a 40 per cent. reduction on last season's crop. This may not be altogether a bad thing, as later it may create a demand in inaccessible districts which are at present neglected.

7. The quality is fair to good and no complaints as to the main crop have as yet been heard, with the exception of the possibly unavoidable wetness early in the quarter. In the Winnebah district it is said to have improved and a prominent native buyer in the Cape Coast district is of the same opinion. That seen in the process of judging in the Cocoa Farm Competition was, for the most part, distinctly good, particularly in the Denkra and Abura divisions. The quality in Assin is not so good.

8. Diseases are reported to be somewhat less in evidence than usual, though personally, I am unable to detect any marked change. No doubt the dry weather experienced in the September quarter acted as a check, but the late heavy rains brought the pod diseases much into evidence, especially as there has been an *increased tendency to leave the pods on the trees as long as possible*. Whilst growers continue to leave husks lying about their farms in great heaps, there is not likely to be any permanent diminution of these diseases—rather the reverse. Of insect pests “Sankonuabe,” cocoa pod borers and “cocoa mosquito” are reported to be prevalent.

9. *Cola*.—The crop is stated to be a poor one owing to the aforementioned climatic conditions, but like cocoa appears to be keeping pace with demand, as prices do not indicate any shortage, and there is little or no demand in the more inaccessible districts. There is not likely to be much extension whilst these conditions obtain.

10. *Coconuts*.—Considerable interest in this crop is reported from the Winnebah district, and 2,000 nuts have been despatched there for distribution. Arrangements are in progress for starting small plantations at Elmina and Eguafu. The progress in the latter case is good, a site having been selected and the promise of the Omanhene to clear the same obtained, but the former is held up owing to conditions not under the control of this Department. The plants (approximately 2,000) recently supplied to the Omanhene of Ebirem are reported to be doing well, a transplanting loss of only 1½% having occurred.

11. Distribution from Assuantsi is still held up by the suspected seedling disease, though it has not yet appeared at that Station.

12. *Oil Palms*.—Propaganda to combat the destruction of these palms for the production of wine was carried out, the Assistant Superintendent, Assuantsi making a tour of the palm growing districts of Cape Coast and Saltpond in, December largely for that purpose.

He appears to have been met with the now common excuses, which shew that if the native is alive to the dangers, he has no present intention of relinquishing a profitable industry. There was some hope of a plot being established at Dominase, a report having been received from the District Commissioner, Saltpond, to that effect, but recent efforts to push the project have not been successful, the chief going so far as to deny any such intention.

13. The Assistant Superintendent, Assuantsi, reports that Millers have begun purchasing palm oil at Saltpond and that palms are now being cleaned up in that district preparatory to supplying the demand.

14. *Fool Crops*.—These appear to be somewhat scarcer in the coasta districts, but there is not any real shortage, at any rate at present.

15. *Agricultural Associations*.—The Gold Coast Agricultural and Commercial Society's Central Province Show was held in Cape Coast in the 23rd November, and was very successful. The 1922 Cocoa Farm Competition, held in the Cape Coast district under the auspices of the same Society, has been brought to a successful conclusion. The prizes remain to be distributed. The Abura division has been most successful in this competition, 17% of the entrants gaining prizes including the first. This is very gratifying, in view of the fact that the proximity of the Assuantsi Agricultural Station is probably the reason for the superiority of this division.

16. *Agricultural Station, Assuantsi*.—Shortage of labour, which is being everywhere felt, has militated against the work on this Station. Various experiments in progress have been reported on separately. The weight of the ten bamboos on the 6th December, was 260 lbs. shewing a total loss of 165 lbs. or 39%.

17. *Hemang Sub-Station*.—This Station was inspected in December and is in a satisfactory condition. Tobacco has done very much better than at Assuantsi, and it is anticipated that a large supply of seeds will be available for distribution.

18. *Coconut Plantation, Cape Coast*.—Shortage of labour is causing serious trouble here, and with the climatic conditions experienced, circumstances have not been exactly helpful, but it is anticipated that the remaining unplanted area will be ready for planting with the first rains of the present year. Given reasonable luck in the matter of labour, it will be completed by the end of the financial year. The Coconut Instructor is careful, as usual, on this point in his report, but I have given him to understand the work *must* be done. The only way of obviating a recurrence of these troubles appears to be contract labour, which with your permission, will be employed in future years.

19. Rhinoceros beetles have made their appearance in the older planted area and one boy is continuously employed in searching for them. The coconut scale insect has also been bad but is now diminishing. A fungus, parasitic on it, has been imported from Tarquah but is not yet established.

WESTERN PROVINCE.

By Mr. A. C. MILES (Provincial Superintendent).

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3. *Itinerant and Instructional Work*.—There has been considerably more work in this direction than during the previous quarter. Weather conditions were favourable and officers available. Provincial Superintendent spent 43 days away from Headquarters, the greater part on special duty at Accra and Seccondee. Superintendent spent 50 days on itinerant duties in northern part of Province and 15 days on special duty at Seccondee. Assistant Superintendent spent 26 days in the Ancobra and Sefwi districts. Temporary Assistant Superintendent was away on general duties in the Axim district for 20 days. Overseer Pobee, general duties in Sefwi district 30 days. Total number of days thus spent was 194.

(i) The rainfall has been good and made up to some extent for shortage during the previous quarter. The second crop of cereals was good in the Rain Forest area, and other crops improved appreciably; thus easing to some extent the feared shortage.

(ii) *Cocoa*.—Increasing interest, referred to in the previous report, has been maintained, both in respect to care of farms and preparation of the product. As the main crop was being harvested during the period under review, efforts were mostly directed to instructions relating to the preparation and curing. Early in the quarter there were indications of improving prices and these materialised, but unfortunately depreciated later, and, at the close were 6d. per load lower than in October. The crop generally would appear to be normal, although it was feared the drought might affect it. In the very interesting report submitted by the Superintendent, he refers to productions in remote places exceeding the ability of the population to market it. He very wisely advised that the best should be selected and only such beans taken to the market for sale. While such advice is justified under the circumstance, it is most regrettable, that owing to lack of transport facilities, there should be an appreciable part of the crop wasted, thereby causing disappointment to the producers and direct loss of revenue to Government.

(iii) **Local Cocoa Instructors.**—Three men have continued to operate in the Sefwi, Bekwai and Anwhiaso Divisions. These men are having the desired effect, for they appear to be on good terms with the people, who give some attention to the advice and demonstrations. Energies have been devoted almost exclusively to picking, breaking and curing the crop. During the quarter 144 days were spent on such work, and 192 different villages visited. In all cases they were given a good reception and at the centres where fermentaries are established the Chiefs gave every assistance to enable Instructors to demonstrate fermentation on a large scale. Training of additional men as Instructors continues and three of these will be sent out shortly.

(iv) **Food Crops.**—In the towns, the shortage has been more marked than usual and prices have been slightly higher; especially for Plantains and Maize. The balls of prepared foods made up from the latter have been slightly reduced in size. Vegetables have been more numerous and slightly cheaper. Fruits especially Oranges and Pines have been plentiful, and, outside of Tarquah reasonable in price.

(v) **Rice.**—The first crop was harvested in good condition and does not appear to have been seriously affected by the drought, except in places where the sowing was late. Sowings for second crop were made and should give good yields as the rainfall was favourable.

4. Agricultural Show.—This was held on 13th December, at Dominase in the Ancobra district under the auspices of the Gold Coast Agricultural and Commercial Society. This, the first show held in that part of the Province, was most successful. It was feared the people might be suspicious and refuse to bring in their crops; every endeavour was made to explain the objects of the Show to the villagers, and these efforts met with no small measure of success, as was proved by the attendance and some 500 exhibits being entered for competition. Cocoa was well represented with 135 entries; the standard of quality was high; making the work of adjudicating prize winners most difficult. Other sections comprising Food Crops, Products suitable for export, Timber, etc., were not so well supported, and lacked the competitive enthusiasm which prevailed amongst cocoa exhibitors. The success of the Show was such that others will be popular and attract far more attention in future.

ASHANTI.

By M. W. CALDWELL (Acting Provincial Superintendent).

In addition to the itinerant work outlined in the district reports, the Acting Provincial Superintendent made tours of instruction in the following districts:—

Akropong, Nkawe and Mpesetia; Nkoranza and villages to Kintampo.

Sub-Stations were also inspected periodically during the quarter.

2. Cocoa.—Unsettled weather conditions prevailed throughout October and the early part of November, consequently cocoa put on the market during that period was scarcely up to the desired standard. With the advent of the dry season a general improvement in the quality was evident and a standard more in accordance with expectations attained. All things considered the price has maintained a surprisingly high level since the season opened. During October and November, the Coomassie market fluctuated between 12s. and 14s. In December, a slight depression has to be recorded; the quotation at the end of the month being 11s.

The opening of the railway through Ashanti-Akim district has brought about a remarkable levelling up of prices along that route. Whereas in previous years the Juaso price was usually about 4s. below the Coomassie figure, the difference this year appears to be less than 1s.

As the cause of this appreciation is obviously a permanent one, it is reasonable to expect that an increased output will be forthcoming from this district in future years. District Officers continue to report that their meetings are well attended.

Available indications suggest that farmers are responding in increasing numbers to the efforts of Agricultural Officers to introduce improved methods of fermentation.

The same satisfactory progress cannot be reported in the matter of sanitation of farms. With few exceptions, farmers continue to show apathy towards instructions given with regard to control of insect pests and fungoid diseases.

3. Fungoid Diseases.—Mr. Alexis reports that in his district (Bekwai-Obuasi) pod diseases are not very prevalent. This is true of some localities. When on tour in the Akropong district at the end of October, I noticed that farms contiguous to the Akropong-Nkwantaye road were singularly free from them. Generally speaking, however, diseased pods form too conspicuous a feature on cocoa farms in many localities and cannot be disregarded. The unsettled weather conditions which prevailed in the early part of the quarter, just at the time when large numbers of pods were approaching the mature, and therefore most susceptible stage, favours their increase. When such unfavourable weather conditions intervene, the farmer not infrequently postpones the harvesting of his crop. The mature pods left on the tree provide ideal grounds for the multiplication and dissemination of the spores.

Thus indirectly the farmer at times further contributes to the development of the menace.

White Thread is also reported from all districts.

4. Food Crops.—Prices of the staple products in Coomassie at the end of the quarter were as follows :—

Yams 9d. to 2s. each ; Corn 10 cobs for 3d. ; Plantains 8 to 10 for 3d. ; Cocoyams 15 for 3d.

Returns from other centres are included in district reports. Perusal of these figures show that at any particular market little variation occurs from quarter to quarter. In other words the price at the various centres appeared to have reached their normal level. Greater discrepancies are evident when different centres are compared. As a general rule prices are highest at centres in proximity to the railway.

5. Kola.—Conflicting reports regarding the state of the Kola market have been received from different centres. All are agreed, however, that the market is very dull. Recent sales in Coomassie have been reported as low as 3d. per 100 nuts. In the past the Kola industry has been a source of considerable revenue to Ashanti. The trend of prices during the past two years, however, suggest that other countries, more favourably situated, are now entering into competition with us. On the other hand the depression may be due to temporary causes. The present position of our Kola industry is, I consider, well worthy of thorough enquiry.

6. Miscellaneous.—(a) An Agricultural Show was held at Juaso on December 16th, under the auspices of the Agricultural and Commercial Society. In addition to the liberal prizes provided by the parent Society, the list was further augmented by generous donations from the Coomassie Chamber of Commerce and Messrs. Cadbury Bros. Ltd.

Three hundred and eighty-nine exhibits were presented for competition in the various classes.

(b) Experiments in the extraction of oil from groundnuts by the native method have been carried out at Ejura during the quarter.

Results were tabulated herewith :—

Variety.	Weight of Nuts.	Weight of Kernels.	Weight of Oil.
Kumawu	24 lbs.	16 lbs.	2½ lbs.
Tamale	25 „	15½ „	2 „

The percentage of oil in groundnut kernels usually varies from 40 to 50 per cent. It would therefore appear from the above figures that only one-third of the oil in the kernels is obtained by native methods of extraction. Similar experiments were carried out with shea-nuts at Kratchi early in the year. The results obtained therefrom were precisely the same, namely that one-third of the fat in the kernels was obtained, the remaining two-thirds being left in the residue. These experiments clearly demonstrate the inefficiency of native methods of extraction and should certainly be taken into consideration when estimates of probable yields are being made. It would be quite futile, for instance, to state that shea trees, producing an average annual yield of 11 lbs. *i.e.* 1,000 nuts, are capable of yielding 3 lbs. of shea butter per tree, per annum, simply because the fat content by chemical analysis works out at that figure. If native methods of extraction only are available, then the yield will obviously have to be reckoned at 1 lb. per tree.

(c) When at Nkoranza, I inspected several cocoa farms in the neighbourhood of the town. The farms displayed a state of neglect. It was fairly obvious from the numbers of the old pods still on the trees that a considerable portion of last year's crop had not been harvested. The cost of transport from Nkoranza to Coomassie by motor road *via* Ejura—a distance of about 100 miles—will no doubt set the limit to production in this area.

In this district the tapping of Fan Palms for palm wine is extensively practised. Unlike the method adapted with the oil palms, *it is the growing tree that is tapped*, but results are the same; invariably the tree succumbs to the process. The soil and climatic conditions pertaining in the Kintampo district are eminently suited for the growth of a wide variety of annual crops.

One or two small plots of tobacco were observed, but its cultivation is not general.

Editorial Notes.—Short Extracts and Correspondence.

“The business of Agriculture is daily increasing in complexity, while competition, accentuated by ease and rapidity of communication, reduces the margin of profit, and diminishes the chances of any colony creating and maintaining favourable conditions leading to large profits from the production of any particular commodity. In these circumstances not only success, but the means of earning a livelihood, depend on the carrying out of work with the highest degree of efficiency and skill and precision, and with the minimum of material loss and effort.”

The quotation is from a speech made by Sir Francis Watts, one of the foremost leaders intropical agricultural research, at the opening of the College of Agriculture in Trinidad. They are here reproduced because it is believed the future of our cocoa industry largely depends upon the farmers following the advice of Agricultural Officers.

Elsewhere it is shown the industry may be much extended by the provision of transport facilities and the opening up of new cocoa areas now under forests. This expansion of the cocoa area must naturally come in the ordinary course of development, provided there is an adequate population to properly deal with the cultivation. On the other hand there may be a grave source of danger from a feeling of security engendered by such available areas, leading to insufficient attention being given to existing cocoa areas. The new areas may be planted, results obtained for a few years and then the areas deemed as worn-out, thus leading to a skimming of the surface riches but leaving the country poorer for future generations.

There is reason to think that after the exhaustion of the organic matter in most of our soils in neglected and worn-out cocoa farms, especially in the absence of shade trees, cocoa will be established again only with much difficulty.

In the opening up of new areas great care should be taken that such errors of the past as too close planting, absence of sufficient shade and drainage, and the selection of unsuitable soils should be avoided; whilst at the same time a combined effort should be made by all farmers to get all farms into a high state of cultivation by such work as mulching and surface tillage, the burial of empty husks, the prompt removal and burial of dead or diseased pods and by the persistent treatment of pests.

Towards this desirable end the cocoa farm competitions should do much. The suggestion is now put forward that in various districts a *Cocoa Farm Health Week* should be organised, somewhat along the lines of Public Health Week as outlined by Dr. Selwyn Clarke in these pages.

THE GRADING AND INSPECTION OF COCOA.

The Superintendent of Agriculture for the Eastern Province has called attention to the following extract from the *West India Committee Circular*, November 9th, 1922, as it is a subject in which this Society must have a keen interest, as effecting the future good name of our product.

“A branch of the Agricultural and Commercial Society has been started at St. Patrick’s (Grenada) and appears to be thriving. The Society has recommended to the Government, the introduction of legislation,

providing for the establishment of grading centres for produce, contending that a man who is an exporter of an inferior quality of cocoa, for example should by law be compelled to indicate this on his packages, in which way he will be effectually prevented from doing injury to the reputation, not only of those planters whose shipments are of a superior grade, but also the Colony as a whole. It recommends that the better qualities of produce should be graded and marked."

THE FOOD OF THE MANATEE OR "MAMMIE FISH."

With reference to the note on page 39 regarding the distribution of one of the food plants of this animal, Mr. F. T. Chipp, the Assistant Director of the Royal Botanic Gardens, Kew, writes The species to which you refer, *Cymodocea nodosa* (*C. aequorea*) is apparently confined to the Mediterranean region. Other species are common around the Indian Ocean from Madagascar to the east coast of Africa, even as far as the Philippines.

"Other species again affect the littoral of the West Indian Islands and coast of Central America. I cannot find any record of one being found along the west coast of the African Continent. I regret I have not time to examine this critically, but these few notes may serve as a guide. It is quite possible the plant does grow with you, and requires only to be found."

We are greatly indebted for the above information, and trust it may incite some plant collector to examine the Volta delta with the object of proving whether the plant does occur in that area.

Whistling Pine (*Casuarina*).—In addition to the value of this tree as described on page 53, it should be remembered the tree can be pollarded to almost any height and that it makes an attractive hedge when the plants are cut to a height of six feet. The new dark green foliage is then very attractive.

**MINUTES OF MANAGEMENT COMMITTEE MEETING HELD
ON THE 12TH DECEMBER, 1922.**

Present.—W. S. D. Tudhope, Esq. (Director of Agriculture), Chairman, W. H. Patterson Esq. (Entomologist), R. B. Band Esq., John Buckman Esq., & A. J. Ocansey Esq.

Apologies for absence.—Apologies for absence were received from the Hon : E. H. D. Nicolls (Director of Public Works), and D. J. Oman Esq. (Director of Education); verbal apologies were also received from Mr. Band for Mr. A. G. C. Leece (Secretary) who was unable to attend owing to sickness and from Mr. Patterson for Mr. R. H. Bunting on tour to the Provincial Agricultural Shows at Dominase and Juaso.

Minutes of Previous Meeting.—The minutes of the 7th November, 1922, as circulated, were taken as read. Mr. Patterson pointing out that on page 4 “Mr.” should read “Mrs.” Patterson, in connection with the preparation of Posters on the pests of Cocoa crops, they were amended accordingly, confirmed and signed.

Matters arising from the minutes ;—

- (a) Question of Transport facilities for foodstuffs to markets in the Eastern Province.
- (b) Improvement of Roads in the Eastern and Western Provinces an. amendment to Ordinance limiting gross weight of lorries to 2½ tons

Mr. Ocansey produced *Government Gazette* No. 7 of 1922, showing the gross weight of lorries to be 3½ tons on certain roads in Ashanti, and further explained the difficult position to which lorry owners had been placed, and the general reactionary effect that this state of affairs must exercise over transport of foodstuffs and produce in the Eastern Province.

Copy of a petition to His Excellency the Governor by Lorry owners in Accra, Christiansborg and Labadi dated first November, 1922, in connection with the subject under discussion and forwarded to the Society under cover of Mr. W. J. Wulff's letter of the 22nd November, 1922, was read by the Chairman. The request was that some action might be taken by the Society to support the Motor Transport owners who had been adversely affected by the limitation of the gross weight of lorries to 2½ tons in the Eastern Province.

The discussion which ensued, was favourable to representations being made to Government on the subject, one of the chief reasons being that by increasing the weight of lorries, charges on foodstuffs, etc., would be lessened.

The Chairman accordingly instructed that the Honourable the Colonial Secretary should be communicated with on Mr. Ocansey's resolution, and that Mr. Wulff be informed that the question had already been taken in hand by the Management Committee.

Mr. Band proposed and was supported by the Chairman that a sub-committee should be appointed to go into the whole question of the supply and transport of foodstuffs to congested areas. Agreed. The following gentlemen were nominated by the Chairman and seconded respectively by Messrs. Band and Buckman, namely :—

Mr. A. J. Ocansey and
Dr. F. V. Nanka-Bruce.

Mr. Patterson proposed Mr. C. H. Knowles, Provincial Superintendent of Agriculture, Eastern Province to be one of the members ; the Chairman seconded and it was passed.

Mr. Patterson brought forward the question of the advisability of starting Food Farm Competitions in the Eastern Province under similar lines to the Cocoa Farm Competition. The Chairman pointed out that while it was the intention of the Society to introduce farm competitions other than cocoa, he was doubtful if more work could be undertaken meantime by the Executive Officers of the Agricultural Department on whom the work fell. It was agreed that the matter be referred to the above sub-Committee on the supply of Foodstuffs for their recommendation.

(c) Lectures to members and non-members of the Society.

Mr. Band proposed and it was agreed that the Secretary should formulate a syllabus of lectures for 1923 to be considered at the next meeting.

(d) Advertising of Slab Chocolate.

It was explained that the object was with a view to increase consumption and the ultimate increase in the sale of cocoa.

It was considered how this Society could help in the matter, and it was suggested that as chocolates were to be advertised at the forthcoming British Empire Exhibition in 1924, the Gold Coast Committee should be communicated with on the subject so that the Gold Coast section might take the matter up. Agreed. The Chairman instructed that the question should be referred to the Cocoa Committee and put on the agenda for their next meeting. Agreed.

Provincial Committee Reports.—Two reports being copies of minutes of the Central Province Committee meetings of the 1st and 17th November, 1922, were read.

The question of the removal of import duty on artificial manures was raised in the minutes of the 17th November, and by a letter dated 1st December, 1922, the Management Committee was requested to make representations in the proper quarter.

The Secretary was instructed to enquire from Government if artificial manures were dutiable before action was taken.

Report by the Accra Exhibition Select Committee.—The Report submitted by the Select Committee to consider details of Exhibition to be held at Accra in January, 1924, was read by the Chairman.

Two letters in connection with the Exhibition from the Chairman, Gold Coast Committee of the British Empire Exhibition dated 11th December, 1922, suggesting that the Accra Exhibition should be held in November, 1923, instead of January, 1924, as proposed, and the West African Lighterage and Transport Company, Limited, with reference to free freight for Exhibits were also read. After discussion in regard to the proposal of holding the Accra Exhibition in November, 1923, it was agreed that a meeting of the General Exhibition Committee should be convened to consider the Report of the Select Committee and the correspondence on the subject.

Election of Members.—The following 36 candidates from the Central Province and 12 from Ashanti Branch were duly elected. The Management Committee expressed appreciation of the efforts of the members of the Central Province Branch in adding to the membership of the Society, and the Secretary was instructed to convey the Committee's thanks to the Honorary Secretary, Central Province Committee.

Nana Tsibu Mensah VII.

Nana Kwamin Nkyi VII.

Kweku Afifa II.

Kutruka Yiadom

Mr. D. C. Monney

Mr. John Essell

Chief Kofi Antu

„ Yaw Binfor

„ Kobina Busumpim

„ Yaw Tsinkuran

Omanhene of Assin Attandaso

Omanhene of Assin Apimenim

Ohene of Andoe

Ohene of Assin Akropong

of Fanti Yankumasie

of Assin Ekrofuom

of Assin Ayinabrem

of Assin Nsuta

„ Koshea

„ Edubeasie

Chief Kwamin Mensah	of Denkera Kyekyewere
Mr. John Tchum	" " "
" Cofie Nkruma	" " "
" Kwesi Arhin	" Kyekyewere
" James Agyiman	" Denkera Kyekyewere
" Kojo Frempong	" " "
Chief Kwesie Entwi	" Buabinso
" Kofi Attah	" "
" Kofi Abrokwa	" "
Ohene Kobina Agyiman	" "
Chief Kweku Ginada	" "
Mr. Kwesie Anokyi	" "
" Kobina Etuandoh	" Kyekyewere
" Kwesie Appiah	Odikro of Ajumaim
Chief Kobina Tsin	of Aboabo
Mr. Kweku Nyankumago	" "
" Kofi Pimpon	" Nyanasie
" Robert Abinsa	" "
" Kojo Kuma	" "
" J. A. Bimpong	" Mampong
" John Nyako	" Womaso
" Kofi Busumpim	" Wawasie
Chief Kobina Entwi	" "
Mr. G. H. Savage	" Cape Coast
Chief Coker	" "
Mr. A. J. E. Bucknor	" "
Chief Yaw Adabanka	" Coomassie
Mr. Cudjoe Berkwi	" "
" Kweku Dinko	" "
" Kweku Duah	" "
" Kweku Essunada	" "
" Cudjoe Fodjoe	" "
" Kwamin Kraah	" "
Chief Attah Kwadwo	" "
Mr. Kwamin Nyami Owusu	" "
" Yaw Tufuor	" "
" Yaw Tsiaku	" "
Chief Kofi Yamuah.	" "

Correspondence.—Two post cards from Messrs. Dulau & Co., dated 31st October, 1922 and 2nd November, 1922, respectively, asking whether the Society desired to continue their subscriptions for 1922 to the Agricultural Journal of India and the Royal Botanic Gardens, Kew Bulletin for 1923, and other periodicals. The Acting Secretary informed the meeting that the Society had money with Messrs. Dulau & Co., and it was agreed that the periodicals be renewed.

Letter from the Honourable the Colonial Secretary dated 7th November, 1922, asking for any observations the Society had to offer with regard to the Memorandum issued by the Fuel Research Board on Fuel for Motor Transport.

The Secretary was instructed to reply that the Society had no comments to offer at the present moment.

Payments.—The following bills were submitted and approved in the case of those relating to Headquarters. It was ordered that in future all accounts for the Provincial Branches should be submitted to the Provinces concerned for payment.

Scottish Mission Book Depot	£0 16 6 for Stationery
Awoonor Press	1 17 6 " Printing Minutes
	8 10 0 " Koforidua Show
	4 17 6 " Juaso Show
Press of the "Voice"	8 0 0 " Koforidua Show
	3 15 0 " Advertisement
Mrs. Delphina Ocquaye	2 13 0 " Koforidua Show
Postmaster-General	1 1 0 " Post Office Box.

Other business.—The Honourable, Dr. Crawford Maxwell, C.M.G., was unanimously elected Vice-President of the Society, on his appointment as Colonial Secretary of this Colony *vice* Mr. A. R. Slater, C.M.G., Governor of Sierra-Leone and now Honorary Vice-President of the Society.

Mr. Band suggested the introduction of Card File System for correspondence and members etc., which was approved.

Mr. Patterson referred to a statement which appeared in the "Gold Coast News" to the effect that there had recently been an innovation in breaking native bullocks to the yoke in the Northern Territories. He pointed out that it was not an "innovation" and referred to the 1911 Annual Report of the Agricultural Department page 14 where the following remarks appeared.

"The success attained by Mr. Saunders in breaking native bullocks to the yoke at Tamale is worthy of special notice as it may revolutionize farming operations in the Northern Territories and assist in solving the difficult matter of transport."

He referred also to page 48 of the same Report and page 12 of both 1912 and 1914 Reports on the same subject.

He thought the statement should not go unchallenged.
The meeting then adjourned.

MINUTES OF MANAGEMENT COMMITTEE MEETING HELD ON THE 9TH JANUARY, 1923.

Present.—W. S. D. Tudhope Esq. (Director of Agriculture), Chairman, W. S. Lyle Esq. (Messrs. F. & A. Swanzy, Ltd.), R. B. Band Esq., J. Hansen Sackey Esq., A. J. Ocansey Esq., John Buckman Esq., and A. G. C. Leece Esq. (Secretary).

Apologies for absence.—Apologies for absence were received from the Hon : John Maxwell, C.M.G. (Secretary for Native Affairs), and from Mr. W. H. Patterson who was absent from the Colony on duty.

Resignation.—A letter dated 4th January 1923, was received from Mr. Tait Stewart (Messrs. Arbour & Stewart), resigning his membership of the Cocoa Committee.

Minutes of previous meeting.—The Minutes of the meeting of the 12th December, 1922, as circulated to members, were taken as read and confirmed.

Matters arising from the Minutes ;—

(a) Syllabus for lectures, 1923.

The Secretary informed the meeting that several parties had been written to on the subject and their favourable replies were awaited before any definite arrangements could be made.

Provincial Committee Reports.—Letter from the Director of Agriculture dated 21st December, 1922, forwarding a report from Mr. C. H. Knowles, Honorary Secretary of the Eastern Province Committee, on the Koforidua Agricultural Show, was placed on the table.

The Honorary Secretary, Central Province Committee, also sent a copy of the Gold Coast Leader of the 25th November, 1922, which contained a report of the Central Province Agricultural Show held at Cape Coast.

It was suggested by Mr. Lyle and agreed that the reports should be circulated to the members of the Management Committee for their perusal.

Date of meeting of General Exhibition Committee.—This was fixed for Tuesday the 23rd January, and the Secretary was directed to communicate with the Hon : Secretary of Accra Masonic Lodge with a view to hiring the ante-room for the occasion.

Election of member.—Mrs. K. Hoyle was duly elected a member of the Society, having been proposed by Mr. Tudhope and seconded by Mr. Lyle.

Correspondence.—Letter from Mr. W. H. Patterson dated 29th December, 1922 with enclosures regarding the importation of fowls for distribution to members of the Society, was read. The prices quoted by Spratt's—35s. each for pullets and £3 for cockerels, were unanimously considered too high. The general opinion expressed, was that the price of birds should not be more than 15s. to 20s. each.

Letter from the Office Assistant of the Society dated 8th January, 1923, asking for an increase of salary, was read.

The Chairman said this was a question for the Executive Committee and should be referred to that Committee which would meet before the next Management Committee.

Payments.—The following bills were submitted and approved for payment :—

Mr. W. G. McKenzie-Skues	£ 2 0 0	for typing work done March.
„ J. Hansen Sackey	£25 0 0	1923, quarter's rent in advance.
Scottish Mission Book Depot	0 5 6	for stationery.

Meeting adjourned.

Minutes of Management Committee Meeting Held on the 6th February, 1923.

PRESENT:—W. S. D. Tudhope Esq., (Director of Agriculture) Chairman
D. J. Oman Esq., (Director of Education), R. H. Bunting Esq., F.L.S. (Asst
Director of Agriculture), W. S. Lyle Esq., (Messrs. F. & A. Swanzy Ltd.) R. B.
Band Esq., John Buckman, Esq., A. J. Ocansey Esq., J. Hansen Sackey Esq.,
and A. G. C. Leece Esq., (Secretary).

APOLOGIES FOR ABSENCE:—Apologies for absence were received
from the Hon. Major F. W. F. Jackson, D.S.O. (Commissioner, Eastern Province)
Hon. E. H. D. Nicolls, O.B.E., (Director of Public Works), and Hon. J. L. Atterbury
(Commissioner, Central Province).

MINUTES OF PREVIOUS MEETING:—The Minutes of the Meeting
of the 9th January, 1923, as circulated to Members, were approved and signed.

**REPORT OF SUB-COMMITTEE APPOINTED TO INSPECT AND
REPORT ON NEW PREMISES FOR THE SOCIETY:**—The report of the
Sub-Committee dated 25th January, 1923, was read by the Secretary, recommend-
ing the rooms offered by the Manager of the Scottish Mission Book Depot as the
most suitable. The rent is £6 per month. The Chairman moved that the Society
should formally accept the offer of the Manager of the Scottish Mission Book
Depot. Mr. Hansen Sackey seconded the motion. Approved.

Under the existing arrangements, the rent of the present premises occupied
had already been paid for the quarter ending 31st March.

The Manager of the Scottish Mission Book Depot had informed the Committee that the offices he had offered the Society were now vacant, and that he had an offer to rent them from February 1st from another party. In the circumstances it was agreed to take over the accommodation offered as from 1st March, and the Secretary was directed to write to the Manager of the Scottish Mission Book Depot to that effect.

The question of a refund for March rent from Mr. Hansen Sackey was mentioned but it was agreed not to press the point.

PROVINCIAL COMMITTEE REPORTS:—Three letters from the Honorary Secretary, Central Province Committee, dated 11th January and 22nd January, 1923, respectively, transmitting (1) statement of account submitted by the Honorary Treasurer, (2) Minutes of a meeting held on the 10th January and (3) Report of Central Province Cocoa Farm Competition, were read.

(1) It was decided that the Provincial accounts should first be submitted to the Executive Committee before presentation to the Management Committee.

(2) Accounts passed for payment at the meeting of the 10th January in connection with the purchase and transport of material for the Agricultural Show amounted to £25 8s. 7d. Donations to the Show amounted to £43.

The members' subscription account amounted to £26 11s. 1d.

(3) No comment was offered on the Cocoa Farm Competition Report.

REPORT OF GENERAL EXHIBITION COMMITTEE MEETING

HELD ON THE 23rd JANUARY, 1923:—

This was read by the Secretary.

The important feature of the report was that this Committee had decided that the Accra General Agricultural and Industrial Exhibition should be postponed till January 1925 in case it should adversely affect the local preparations for the British Empire Exhibition London 1924.

Mr. Oman moved that this Committee should adopt the report.

Mr. Lyle seconded, and it was passed.

The Chairman moved that a letter of appreciation be written to the Accra Exhibition Select Committee for the excellent work performed in preparing the admirable report submitted by them.

Mr. Buckman seconded. Agreed unanimously.

ELECTION OF MEMBERS:—The following were duly elected members of the Society.

Mr. J. Henley Coussey, B.L.,	Accra.
„ V. L. Buckle, B.L.,	„
„ P. A. Renner, B.L.,	„
„ A. B. Nartey,	„
„ C. J. Reindorf	„
Mrs. Freda Hansen Sackey	„
Mr. J. A. Sampson	Agona Soadru.
„ Emil Djamping	Akim Soadru.

CORRESPONDENCE:—A letter dated 1st February, 1923, from the Accra Chamber of Commerce, acknowledging receipt of 10 copies of the Society's Journal Vol. II No. 1 was read.

Letter from Mr. Band dated 2nd February, 1923, giving notice.

(1) to raise the question of the Society's Office hours

(2) Distribution of Journal

(3) Sale of Journal, was read.

Mr. Band suggested that the office hours should be fixed from 10 a.m. to 12 noon and from 2 to 4 p.m., as he considered it improbable that any member would consult the Library between the hours of 12 noon and 2 p.m.

The Secretary read the decision of this Committee on the subject at the meeting of October 3rd last, fixing the hours from 10 a.m. to 2 p.m.

Mr. Buckman explained that the question was fully discussed at that meeting and that some variation might be necessary. After several members had expressed their views the chairman suggested the question be referred to the Executive Committee to decide this matter after consultation with the Secretary.

(2) *Distribution of Journal.*

Mr. Band said he received complaints from certain members who thought he was still the Secretary that they had not received the Journal a week after the winter had delivered them.

The Secretary explained that there was difficulty in getting wrappers from the local stores; also that at the time of the last issue of the Journal, work connected with arrangements for the meeting of the General Exhibition Committee was on hand.

(3) *Sale of Journal.*

It was reported that difficulty was being experienced placing the Journals for sale. The Secretary was directed to approach the Scottish Mission Book Depot and Messrs. John Radcliffe, with a view to increasing the sale.

Fifty copies had been sent to each of the Provincial Branches of the Society.

Mr. Hansen Sackey kindly offered to accept a few copies for sale in his store. It was agreed that the whole matter should be reviewed and the Secretary

was requested to draw up a statement of Sales

PAYMENTS:—The following bills were submitted and approved for payment:—

Awoonor Press	£4	12	6	for printing work.
" " " " "	1	17	6	" " "
Scottish Mission Book Depot. ..	0	16	4	
Scottish Mission Book Depot. ..	0	13	0	" stationery.
" " " " "	0	16	4	" "
Accra Masonic Lodge	1	0	0	Hire of "Masonic Hall.
Transport of Chairs	6	5	0	

OTHER BUSINESS:—The Chairman brought up the question of prices quoted for fowls at the meeting of January, 1923, and pointed out that in reading the "Scottish Farmer" newspaper he observed fowls were being sold by auction in England as high as 56s. each.

Mr. Lyle remarked that the fowls offered at the quotations given by Mrs. Stoughton ought to interest native buyers.

The meeting was adjourned.

Minutes of Management Committee Meeting Held on the 6th March, 1923.

Present:—W. S. D. Tudhope, Esq., (*Director of Agriculture*) *Chairman*, D. J. Oman, Esq., (*Director of Education*), R. H. Bunting, Esq., *F.L.S. (Ass. Director of Agriculture)*, R. Coull, Esq., *B.Sc., (Chemist)*, R. B. Band, Esq., A. J. Ocansey, Esq., John Buckman, Esq., Hon. Nana Ofori Atta, *C.B.E., (Omanhene of Akim Abuakwa)* and A. G. C. Leece, Esq., (*Secretary*.)

Apologies for absence:—Letters of Apologies for absence were received from the Hon. E. H. D. Nicolls, *O.B.E., (Director of Public Works)*, Hon. Major F. W. F. Jackson, Esq., *D.S.O., (Commissioner, Eastern Province)*, and W. S. Lyle, Esq., (*Messrs. F. & A. Swanzy Ltd.*)

Minutes of previous meeting:—The minutes of the meeting of the 6th February, 1923, as circulated to members, were approved and signed.

Matter arising from the minutes—:
Sale of Journals.

Steps to be taken to increase the sale of the Society's Journal were discussed, as it was felt that the Journal was a very useful publication and should have a large sale.

Mr. Ocansey kindly offered as a beginning to take ten copies of each edition as it was published, for sale at his inland stores, and offered to do what he could to dispose of same.

Provincial Committee report:—Report on the Agricultural Show held at Dominase on 15. 12. 22 from the Honorary Secretary, Western Province Committee, was read by the Secretary.

Election of member:—Dr. M. W. Fraser, Medical Officer, Ho, was duly elected a member of the Society.

Correspondence:—A letter dated 2nd February, 1923, from Mr. Emil Djamping, Akim Soadru, was read, *re* supply of Tobacco plants and information as to their proper treatment. The Secretary was directed to reply that the Provincial Superintendent of Agriculture at Cape Coast would give all possible assistance and advice on application and that the Society sent their best wishes for the success of the venture.

A letter dated 4th January, 1923, from Mr. Chas. Miller, Canary Island, under cover of a memo dated 5th February, 1923, from the Director of Agriculture offering fruit trees and live-stock for sale was read. The Secretary was instructed to send, in reply, a copy of the Journal and quote rates for advertisements.

A letter dated 10th February, 1923, from Messrs. Anglo-Guinea Produce Company, Limited, covering a sample of "Coanucopi" was read. The Committee desired further information before recommending the use of this article, and the Secretary was instructed to write for further details, and an analysis.

A letter dated 13th February, 1923, from the Colonial Secretary's Office, which the Secretary had already acknowledged, informing the Committee that their application for a free issue of the Gold Coast News had been granted, was read.

A letter dated 7th February, 1923, from the Lands and Forests Department, Sierra Leone, covering Annual Reports for 1921 of the Agricultural and Forestry Department, was read. It contained a request for a free supply of the Society's Journal as published, which was approved.

Payments :—The following bills were submitted and approved for payment :—W. A. L. & Transport Co. 7s. 6d. for hire of boys.

Horse & Cart Transport	13s. 6d. for removing furniture from old to new offices.
Tarquah Trading Co.	4s. 6d. purchase of a broom.
Awoonor Press	£1 17s. 6d. for printing minutes.

The Chairman expressed his approval of the economical manner in which the removal of the Society's Headquarters had been carried out.

Other business :—The Secretary pointed out that as March 31st was the end of the Society's Financial Year, it would become necessary for the books to be audited.

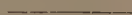
Mr. Band proposed that the Audit Department be approached with a view to the work being performed by one of the auditing staff, and that a fee of £5 5s. be granted for the services rendered. This was approved.

The meeting then adjourned.

ACCRA EXHIBITION.



HAS BEEN POSTPONED TILL END
OF 1924, OR BEGINNING OF 1925.



It is hoped this will be the means of making the exhibition a
greater success for following on the :—

BRITISH EMPIRE EXHIBITION

NO. 280



Exhibitors from England may be expected to make a big display.

FOR SALE.

CHOICE FRUIT

WE HAVE THE FINEST GRAPEFRUIT, ORANGES,
TANGERINES, PINEAPPLES, AVOCADO PEARS,
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CASES OF MIXED FRUIT SUPPLIED

AT 10s. PER PETROL BOX SIZE, OR AS DESIRED
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TELEGRAPHIC ADDRESS:—

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IF YOU TAKE A PRIDE IN YOUR
GARDEN AND WISH TO GROW THE
MOST BEAUTIFUL FLOWERS AND
THE CHOICEST VEGETABLES

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Seeds

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COTTON & WOOLLEN GOODS, WEARING APPAREL,
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1921 AND 1922 MODELS IN STOCK,

At greatly reduced prices.

TOURING CARS FOR HIRE.

G.M.C. and REO SPARE PARTS FOR SALE.

FRESH PROVISIONS and
FRUIT by every mail steamer.

IMPROVEMENT OF POULTRY.

1. The Society is making arrangements for the importation of improved breeds of fowls.
2. The fowls will be sold at cost price to members.
3. Members wanting such fowls should write to their Local Secretary.
4. A deposit of not less than 10s. for each fowl ordered must be made with the order. No order will be booked without such deposit.
5. The balance of the purchase money must be paid on receipt of the fowls.

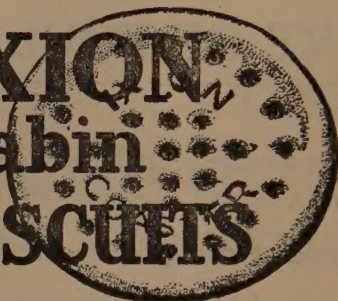
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Accra.*

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All the leading Stores in West Africa supply "Ixion" Cabin Biscuits. Be sure to see the name "Ixion" on every Biscuit.

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1924.

*All the Empire is to be represented at the Largest
Exhibition ever held.*

*Every one in the Gold Coast should do his or her share to
make the Colony's Section worthy of it.*

*Go to the nearest District Commissioner. He will tell
you how you can help.*

THE HELP OF EVERY ONE IS WANTED.

*Photographs, Paintings, Carvings, Jewellery,
Furniture, Ornaments, Native Cloths, Works of Art,
etc., may be lent or purchased.*

ALL MATERIAL SHOULD BE READY
BY DECEMBER 1923.

THE COLONIAL BANK



Established in 1836.

Sanctioned by Royal Charter and under the
Authority of Parliament.

SUBSCRIBED CAPITAL	..	..	£3,000,000
PAID UP CAPITAL	..	..	£900,000
RESERVE FUNDS	..	..	£300,000

CHARLES H. HEWETT and E. HYSLOP BELL, *Joint General Managers.*

J. D. RACE, *Secretary.*

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Koforidua and Nsawam (Gold Coast), Bathurst (Gambia), Lagos, Ebute
Metta, Jos, Port Harcourt, Kano, Burutu Ibadan, Zaria, (Nigeria),
Freetown (Sierra Leone), Victoria (Cameroons).

Agency. Other Branches
shortly to be opened.

GENERAL BANKING BUSINESS CONDUCTED.

Current Accounts are opened by the Bank in London and at its Branches.

Deposits are received by the Bank in London and at its Branches subject
to notice of withdrawal or special arrangements.

Colonial and Foreign Exchange.—The Bank issues Letters of Credit, Drafts
on Demand, Telegraphic Transfers, Negotiates approved Bills of
Exchange, Receives Bills for Collection, Buys Foreign Coupons.

Imports and Exports.—The Bank offers special facilities for financing
essential Imports and Exports.